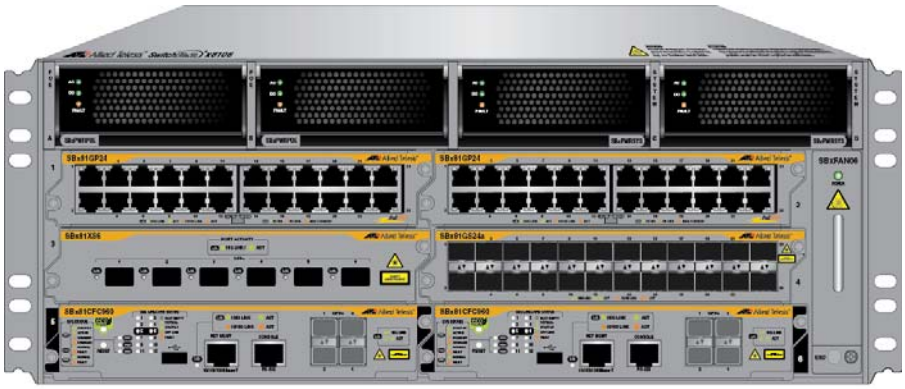
SwitchBlade x8106

Layer 3+ Chassis Switch

AT-SBx81CFC960

Controller Fabric Card

- AT-SBx8106 Chassis
- AT-SBx81GT24 Ethernet Line Card
- AT-SBx81GT40 Ethernet Line Card
- AT-SBx81GP24 Ethernet PoE Line Card
- AT-SBx81GS24a Ethernet SFP Line Card
- AT-SBx81XS6 Ethernet SFP+ Line Card
- AT-SBx81XS16 Ethernet SFP+ Line Card
- AT-SBxPWRSYS1 AC and DC Power Supplies
- AT-SBxPWRPOE1 AC Power Supply



Installation Guide

613-001935 Rev. B

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Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission
Radiated Energy Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada
This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment
This Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

EMI/RFI Emissions: FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A

> **Warning:** In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Immunity: EN55024

Electrical Safety: EN60950-1 (TUV), UL 60950-1 ($_{C}UL_{US}$), EN60825

Safety Agency Approvals: $_{C}UL_{US}$, TUV, C-TICK, CE

Laser Safety EN60825

Translated Safety Statements

Important: The ☞ indicates that a translation of the safety statement is available in a PDF document titled “Translated Safety Statements” on our web site at **http://www.alliedtelesis.com/support**.

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Preface

This guide contains the hardware installation instructions for the Layer 3+ SwitchBlade x8106 Chassis Switch. The preface contains the following sections:

- ❒ “Structure of the Installation Guide” on page 16
- ❒ “Safety Symbols Used in this Document” on page 17
- ❒ “Contacting Allied Telesis” on page 18

Note
This version of the installation guide applies to release 5.4.4 of the AlliedWare Plus™ Operating System for the SwitchBlade x8106 Chassis Switch and AT-SBx81CFC960 Controller Fabric Card.

Structure of the Installation Guide

This guide has the following three sections:

- Section I: Hardware Overview

  The chapters in this section describe the hardware components of the product, including the Ethernet line cards, AT-SBx81CFC960 Controller Fabric Card, and power supplies. You should start here if you are unfamiliar with the switch. A basic understanding of the hardware may help you avoid making mistakes during the installation procedures.

- Section II: Installing the Chassis

  The chapters in this section contain the hardware installation instructions for the device. They explain how to select a site, assemble the hardware components, cable the ports, power on the unit, and confirm the hardware operations of the various components. After completing the instructions in this section, you may either begin to configure the operating parameters and features of the chassis with the commands in the command line interface of the AlliedWare Plus™ operating systems, as described in the Software Reference for SwitchBlade x8100 Series Switches, or proceed to Section III to build a stack of two chassis with the VCStack Plus™ feature.

- Section III: Building a Stack with the VCStack Plus Feature

  The chapters in this section describe the VCStack Plus feature and the additional hardware and software components required to build a stack. The section also contains step-by-step instructions on how to configure the AlliedWare Plus operating systems on the switches for the stacking feature. You should perform these instructions after you have installed the two chassis of the stack at their respective sites and confirmed their operations with the instructions in the chapters in Section II of this guide. You might want to review the information in Chapter 14, “VCStack Plus Overview” on page 269 prior to installing the chassis to acquaint yourself with the feature and guidelines.

Safety Symbols Used in this Document

This document uses the following conventions.

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Warning
Laser warnings inform you that an eye or skin hazard exists due to the presence of a Class 1 laser device.

Warning
Fan warnings inform you of danger from hazardous moving fan blades.

Contacting Allied Telesis

If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **www.alliedtelesis.com/support**. You can find links for the following services on this page:

- 24/7 Online Support — Enter our interactive support center to search for answers to your product questions in our knowledge database, to check support tickets, to learn about RMAs, and to contact Allied Telesis technical experts.
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- Software Downloads — Download the latest software releases for your managed products.

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Section I

Hardware Overview

This section contains the following chapters:

- Chapter 1, “Chassis and Power Supplies” on page 21
- Chapter 2, “Ethernet Line Cards” on page 37
- Chapter 3, “AT-SBx81CFC960 Controller Fabric Card” on page 59

Chapter 1

Chassis and Power Supplies

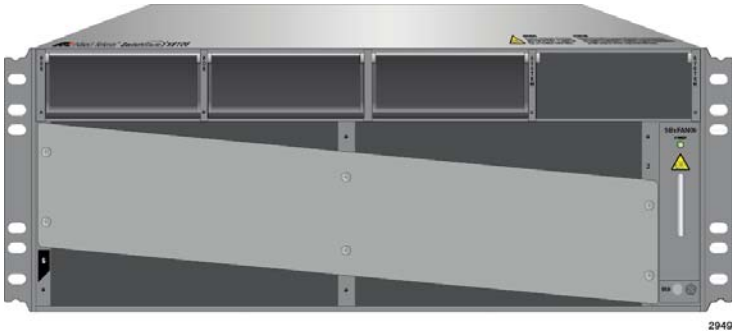
This chapter describes the Layer 3+ SwitchBlade x8106 Chassis Switch in the following sections:

- ❒ “Introduction” on page 22
- ❒ “AT-SBx8106 Chassis” on page 24
- ❒ “Slots for the Ethernet Line and Controller Cards” on page 26
- ❒ “Slots for the Power Supplies” on page 27
- ❒ “AT-SBxPWRSYS1 AC Power Supply” on page 28
- ❒ “AT-SBxPWRPOE1 Power Supply” on page 30
- ❒ “AT-SBxPWRSYS1 DC Power Supply” on page 32
- ❒ “AT-SBxFAN06 Module” on page 34
- ❒ “Power Supply Interfaces (Opto-couplers)” on page 35

Note
This version of the installation guide applies to release 5.4.4 of the AlliedWare Plus Operating System for the SwitchBlade x8106 Chassis Switch and AT-SBx81CFC960 Controller Fabric Card.

Introduction

The SwitchBlade x8106 product is a modular Layer 3+ Ethernet switch. The main components are the AT-SBx8106 Chassis, Ethernet line cards, a controller card, system power supply, Power over Ethernet Plus (PoE+) power supply, and fan module. The AT-SBx8106 Chassis is shown in Figure 1.



The chassis has slots for four Ethernet line cards and two controller cards, or five line cards and one controller card. The chassis also has slots for two system power supplies and two PoE+ power supplies.

Figure 1. AT-SBx8106 Chassis

Figure 2 illustrates the power supply modules.

AT-SBxPWRSYS1 AC Power Supply for the Ethernet line cards, controller card, and fan module.

AT-SBxPWRPOE1 AC Power Supply with 1200 W PoE budget for the ports on the AT-SBx81GP24 PoE Ethernet Line Card.

AT-SBxPWRSYS1 DC Power Supply for the Ethernet line cards, controller card, and fan module.

Figure 2. Power Supply Units

Figure 3 illustrates the fan module.

AT-SBxFAN06 Module Cooling module for the chassis.

Figure 3. Fan Module

AT-SBx8106 Chassis

The AT-SBx8106 Chassis is a 4RU unit with slots for four Ethernet line cards and two AT-SBx81CFC960 Controller Cards, or five line cards and one controller card. The chassis also has slots for two system power supply modules and two PoE power supply modules. The chassis components are identified in Figure 4 here and Figure 5 on page 25.

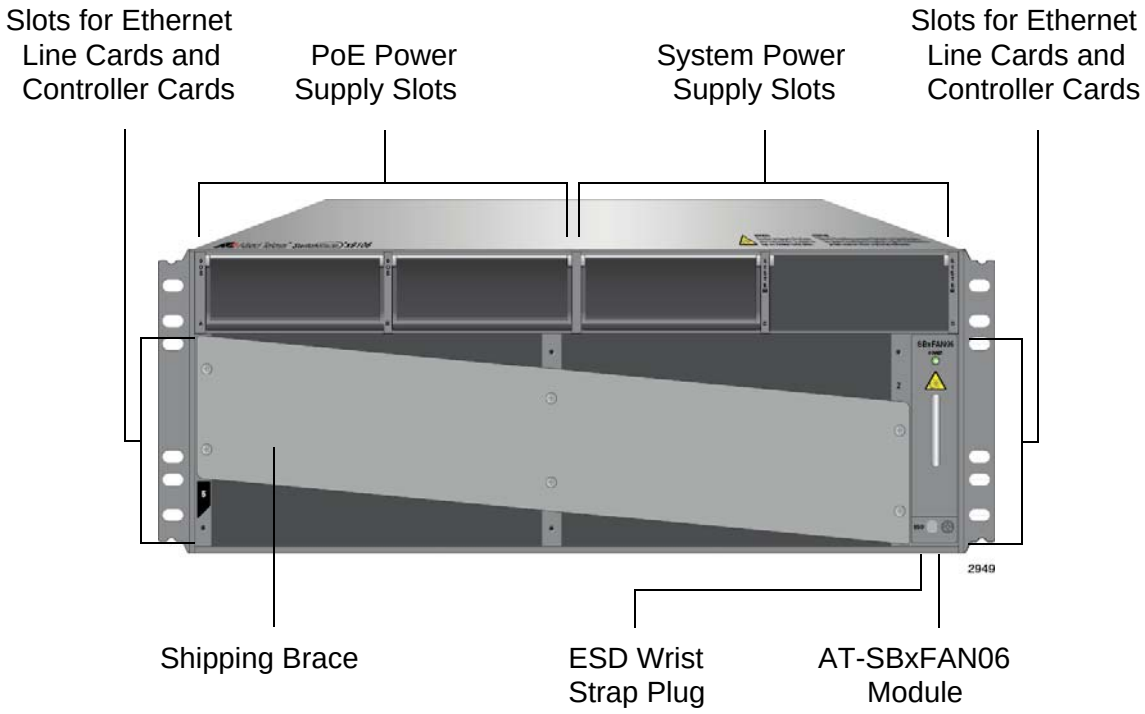

Slots for Ethernet Line Cards and Controller Cards
PoE Power Supply Slots
System Power Supply Slots
Slots for Ethernet Line Cards and Controller Cards
2949
Shipping Brace
ESD Wrist Strap Plug
AT-SBxFAN06 Module

Figure 4. Front View of the AT-SBx8106 Chassis

Note
Do not remove the shipping brace from the front of the chassis until after the unit is installed in the equipment rack. You might bend the chassis and cause misalignment of the slots and card guides if you lift the chassis into the equipment rack without the shipping brace.

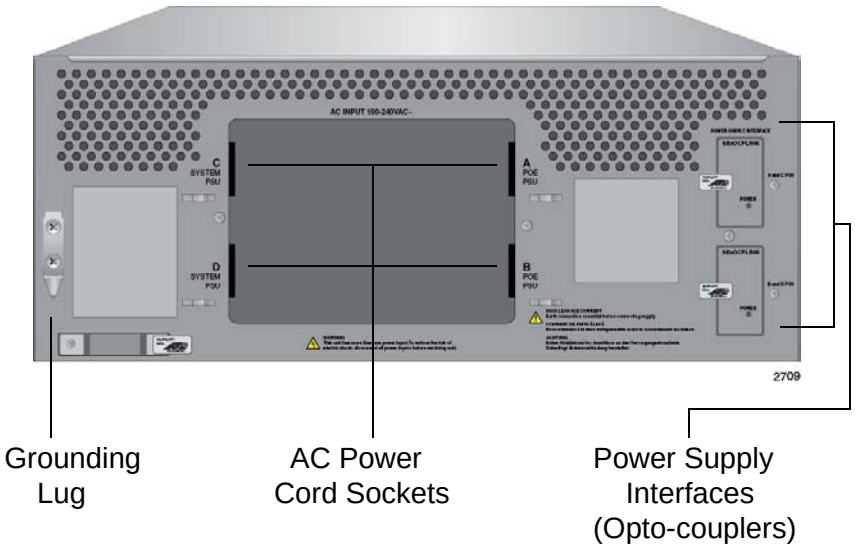


Figure 5. Rear View of the AT-SBx8106 Chassis

Figure 6 is an example of a fully populated chassis.

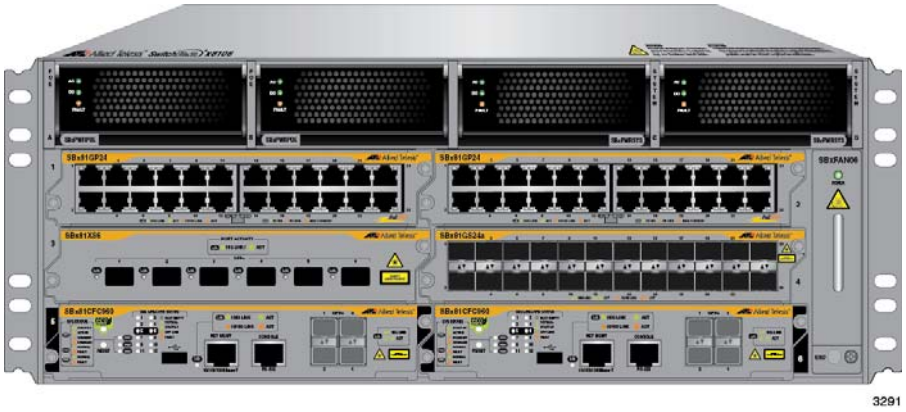


Figure 6. AT-SBx8106 Chassis with Line Cards, Controller Cards, and Power Supplies

Slots for the Ethernet Line and Controller Cards

The chassis has slots for four Ethernet line cards and two AT-SBx81CFC960 Controller Cards, or five line cards and one controller card. The slot definitions are predefined and may not be changed. Figure 7 identifies the slots.

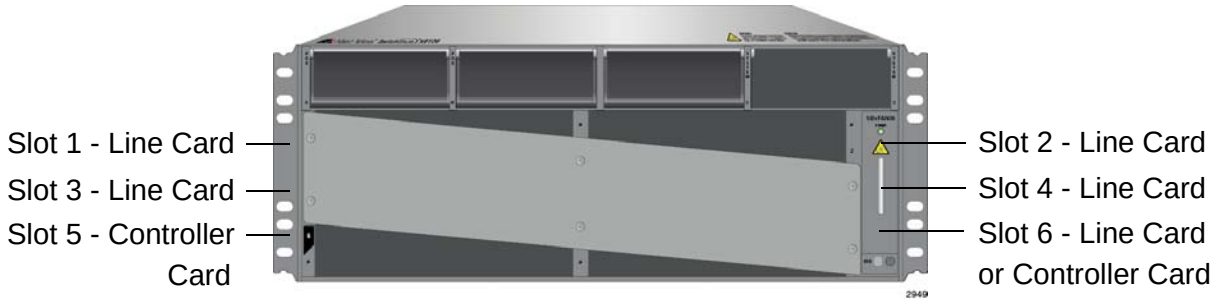

Slot 1 - Line Card
Slot 3 - Line Card
Slot 5 - Controller Card
Slot 2 - Line Card
Slot 4 - Line Card
Slot 6 - Line Card or Controller Card

Figure 7. Ethernet Line and Controller Cards Slots

Slots 1 to 4 are for the Ethernet line cards. The cards may be installed in any order or variety in the slots.

Slot 5 is for the AT-SBx81CFC960 Controller Fabric Card. The chassis must have a controller card. The Ethernet line cards do not forward traffic if the chassis does not have a controller card. The controller card stores the management software and configuration settings for the Ethernet line cards and controls the backplane in the chassis, which the line cards use to forward network traffic to each other. The backplane has a bandwidth of up to 80 Gbps for each line card slot when the chassis has one controller card.

Slot 6 has a dual function. You may use it with an Ethernet line card to add more ports to the chassis or a second controller card to add controller card redundancy and to increase the bandwidth of the backplane. The chassis has a backplane bandwidth of up to 160 Gbps for each line card slot where there are two controllers cards.

Slots for the Power Supplies

The chassis has four power supply slots, labelled A to D, across the top of the front of the chassis, as shown in Figure 8.

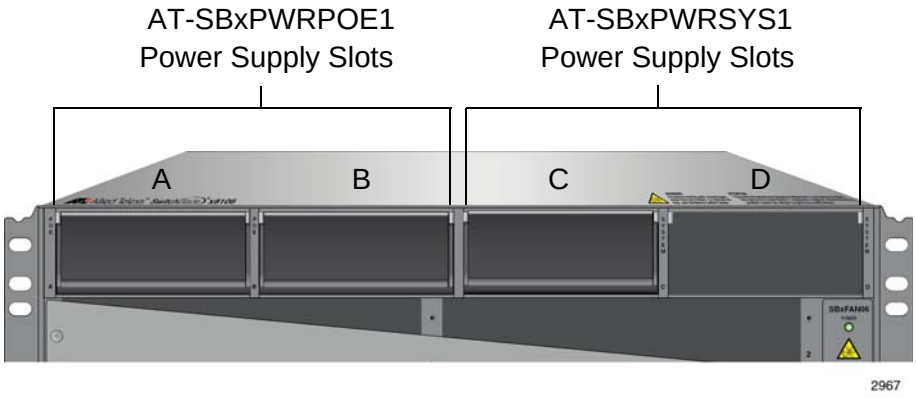


Figure 8. Power Supply Slots

Slots A and B are for the AT-SBxPWRPOE1 AC Power Supply, shown in Figure 2 on page 22. The power supply is used to provide power to the PoE ports on the AT-SBx81GP24 Line Card. (These slots are not used if the chassis does not have AT-SBx81GP24 Line Cards.) There are two slots for AT-SBxPWRPOE1 AC Power Supplies. You may install two modules to increase the available PoE power for the powered devices or to add power redundancy. For more information, refer to “Power over Ethernet on the AT-SBx81GP24 Line Card” on page 56.

Slots C and D are for the AT-SBxPWRSYS1 Power Supply, which powers all the hardware components of the chassis, except for the PoE feature on the ports of the AT-SBx81GP24 PoE Line Card. The chassis must have at least one AT-SBxPWRSYS1 Power Supply. One module can power a fully populated chassis. However, you may install two power supplies to add power redundancy to the chassis.

There are AC and DC versions of the AT-SBxPWRSYS1 Power Supply. Refer to Figure 2 on page 22 for illustrations of the modules.

Note

The AT-SBxPWRSYS1 DC Power Supply is not compatible with the AT-SBxPWRSYS1 AC or AT-SBxPWRPOE1 AC Power Supply. You should not operate the chassis with both AC and DC power supplies. You may, however, operate the chassis for a short period of time with AC and DC power supplies if you are converting it from one type of power supply to another, such as from AC to DC. This allows you to transition the chassis without having to power it off.

AT-SBxPWRSYS1 AC Power Supply

The AT-SBxPWRSYS1 AC Power Supply, shown in Figure 9, is the power supply unit for the chassis. It supplies power to all the hardware components in the chassis, except for the PoE feature on the ports on the AT-SBx81GP24 Line Cards. The PoE feature is powered by the AT-SBxPWRPOE1 Power Supply.

Figure 9. AT-SBxPWRSYS1 Power Supply

A single AT-SBxPWRSYS1 Power Supply can support a fully populated chassis, with any combination of Ethernet line cards. The chassis can have two AT-SBxPWRSYS1 Power Supplies for power redundancy.

Power supply modules are not included with the chassis and must be purchased separately.

The AT-SBxPWRSYS1 Power Supplies are installed in the two right hand slots, labeled C and D, at the top of the front of the chassis. If you are installing just one power supply, you may install it in either slot. The locations of the slots are shown in Figure 6 on page 25.

The AT-SBxPWRSYS1 Power Supply is hot swappable. If a chassis has two power supplies and one of them fails, you may replace the failed unit without having to power off the chassis.

LEDs

The LEDs on the AT-SBxPWRSYS1 are described in Table 1.

Table 1. AT-SBxPWRSYS1 Power Supply LEDs

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.

Table 1. AT-SBxPWRSYS1 Power Supply LEDs (Continued)

LED	State	Description
DC	Solid Green	The power supply is providing DC power that is within the normal operating range.
	Off	The power supply is not generating DC power or the power is outside the normal operating range.
Fault	Solid Amber	A power supply has detected a fault condition, such as an under-voltage, or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

AT-SBxPWRPOE1 Power Supply

The AT-SBxPWRPOE1 Power Supply, shown in Figure 10, provides the PoE power for the ports on the AT-SBx81GP24 PoE Line Cards. You may install either one or two PoE power supplies in the chassis.

The AT-SBxPWRPOE1 Power Supply provides 1200 watts of power for PoE. You may install two power supplies in the chassis for a total of 2,400 watts of power.

The total number of powered devices the chassis can support depends on the number of AT-SBxPWRPOE1 Power Supplies in the chassis and the power requirements of the devices. For instance, a chassis can support 40 ports of Class 4, PoE+ (IEEE 802.3at) powered devices with one power supply or 80 ports with two power supplies. For further information, refer to Table 15 on page 57.

Figure 10. AT-SBxPWRPOE1 Power Supply

Power supply modules are not included with the chassis and must be purchased separately.

The AT-SBxPWRPOE1 Power Supplies are installed in the two left hand slots, labeled A and B, at the top of the front of the chassis. If you are installing only one power supply, you may install it in either slot. The locations of the slots are shown in Figure 6 on page 25.

The AT-SBxPWRPOE1 Power Supply is hot swappable. You do not have to power off the chassis to install or remove the power supply.

LEDs

The LEDs on the AT-SBxPWRPOE1 Power Supply are described in Table 2 on page 31.

Table 2. AT-SBxPWRPOE1 Power Supply LEDs

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.
DC	Solid Green	The DC power provided by the power supply to the line cards over the backplane is within the normal operating range.
	Off	The power supply is not providing any DC power or the power is not within the normal operating range.
Fault	Solid Amber	The power supply has detected a fault condition, such as an under-voltage or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

AT-SBxPWRSYS1 DC Power Supply

The AT-SBxPWRSYS1 DC Power Supply, shown in Figure 11, is a DC version of the power supply unit for the chassis and may be used in place of the AT-SBxPWRSYS1 AC Power Supply in network environments that have DC wiring. Like the AC power supply, the module supplies power to all the hardware components in the chassis, except for the PoE feature on the ports on the AT-SBx81GP24 Line Cards.

Figure 11. AT-SBxPWRSYS1 DC Power Supply

A single AT-SBxPWRSYS1 Power Supply can support a fully populated chassis, with any combination of Ethernet line cards. The chassis can have two AT-SBxPWRSYS1 Power Supplies for power redundancy.

Power supply modules are not included with the chassis and must be purchased separately.

The AT-SBxPWRSYS1 Power Supplies are installed in the two right hand slots, labeled C and D, at the top of the front of the chassis. If you are installing just one power supply, you may install it in either slot. The locations of the slots are shown in Figure 8 on page 27.

The AT-SBxPWRSYS1 Power Supply is hot swappable. If a chassis has two power supplies and one of them fails, you may replace the failed unit without having to power off the chassis.

Note

The AT-SBxPWRSYS1 DC Power Supply is not compatible with the AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 AC Power Supplies. Consequently, the chassis should not contain both AC and DC power supplies. You may, however, operate the chassis for a short period of time with AC and DC power supplies if you are converting it from one type of power supply to another, such as from AC to DC. This allows you to transition the chassis without having to power it off.

Note
To avoid installing both AC and DC power supplies in the same chassis, you should use the AT-SBxPWRSYS1 AC Power Supply, and not the DC module, as the system power unit if the chassis contains one or more AT-SBx81GP24 PoE Line Cards.

LEDs

The LEDs on the power supply are described in Table 3.

Table 3. LEDs on the AT-SBxPWRSYS1 DC Power Supply

LED	State	Description
DC IN	Solid Green	The power supply is receiving DC power that is within the normal operating range.
	Off	The power supply is not receiving power from the DC power source.
DC OUT	Solid Green	The DC power that the module is providing to the chassis components is within the normal operating range.
	Off	The power supply is not generating DC power or the power is outside the normal operating range.
Fault	Solid Amber	The power supply has detected a fault condition, such as an under-voltage, or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

AT-SBxFAN06 Module

The AT-SBxFAN06 Module, shown in Figure 12, is the cooling unit for the chassis. It is a field- replaceable assembly that is factory installed and shipped with the AT-SBx8106 Chassis.

The module is controlled by the AT-SBx81CFC960 Controller Fabric Card. The fan speeds are automatically adjusted according to the internal operating temperature of the switch. The fans are at their lowest speed when the ambient temperature coming into the fan is approximately 20° C. The fan speeds increase to provide additional cooling as the ambient temperature rises.

Figure 12. AT-SBxFAN06 Module

Note
Only an authorized service technician should replace the fan module.

LED

The POWER LED on the AT-SBxFAN06 Module is described in Table 4.

Table 4. AT-SBxFAN06 Module LED

LED	State	Description
Power	Solid Green	The AT-SBxFAN06 Module is receiving power.
	OFF	The AT-SBxFAN06 Module is not receiving power or has failed.

Power Supply Interfaces (Opto-couplers)

The chassis has two power supply interfaces, also referred to as opto-couplers, in the lower right corner on the rear panel. The interfaces, labeled Power Supply Interface, are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 13.

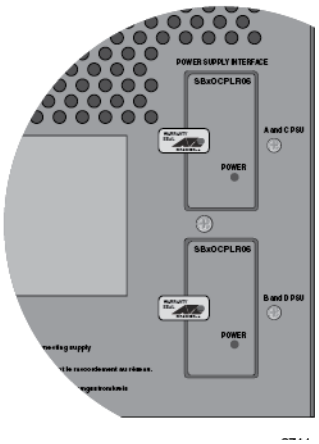


Figure 13. Power Supply Interfaces (Opto-couplers)*

The controller card uses the top interface to communicate with the power supplies in slots A and C, and the bottom interface to communicate with the power supplies in slots B and D.

Caution
Power supply modules are hot swappable, but power supply interfaces are not hot swappable. Power supply interfaces should only be serviced by an authorized service technician.

LED Each interface has one LED, labeled Power. The LED is described in Table 5 on page 36.

Table 5. Power Supply Interface LED

LED	State	Description
Power	Solid Green	The interface is operating normally.
	Off	Here are the possible conditions for this LED state: ❒ The corresponding power supply slots of the interface are empty. ❒ The power supplies in the power supply slots are powered off or have failed. ❒ The power supplies in the power supply slots are powered on and functioning normally, but the power supply interface has failed.

Chapter 2

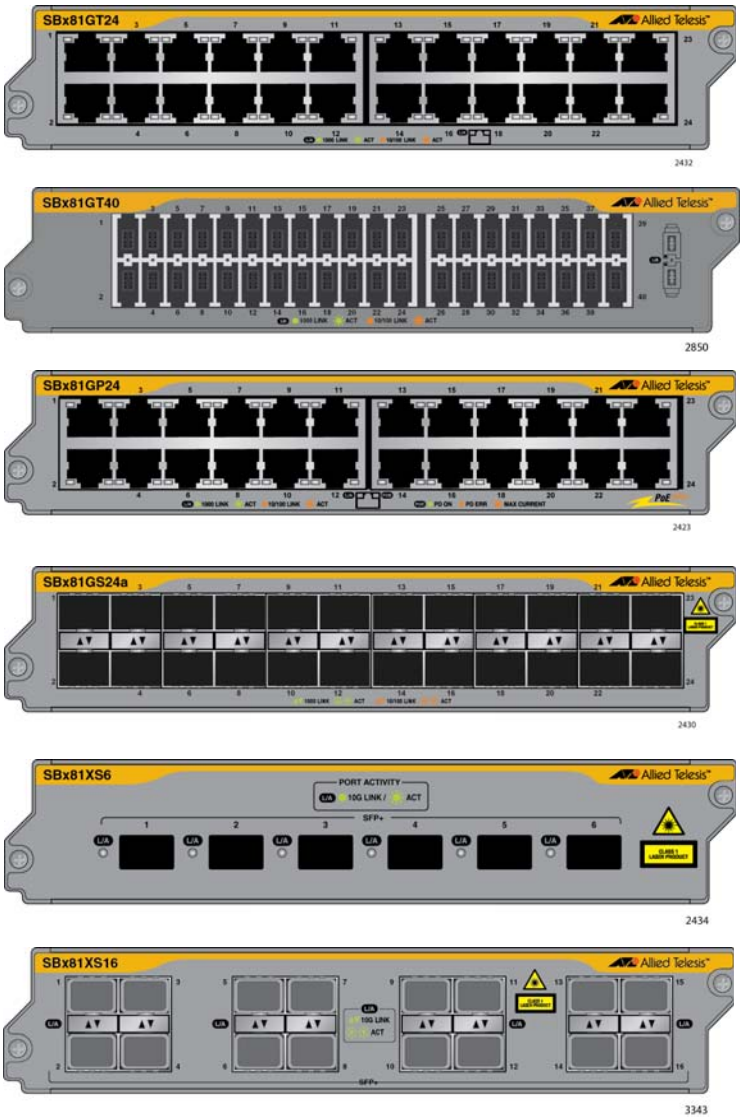
Ethernet Line Cards

This chapter describes the Ethernet line cards for the SwitchBlade x8106 Chassis Switch in the following sections:

- “Ethernet Line Cards” on page 38
- “AT-SBx81GT24 Line Card” on page 39
- “AT-SBx81GT40 Line Card” on page 41
- “AT-SBx81GP24 PoE Line Card” on page 44
- “AT-SBx81GS24a SFP Line Card” on page 47
- “AT-SBx81XS6 SFP+ Line Card” on page 49
- “AT-SBx81XS16 SFP+ Line Card” on page 51
- “10/100/1000Base-T Twisted Pair Ports” on page 53
- “Power over Ethernet on the AT-SBx81GP24 Line Card” on page 56

Ethernet Line Cards

The Ethernet line cards are shown in Figure 14.



AT-SBx81GT24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports.

AT-SBx81GT40 Ethernet Line Card with 40 10/100/1000Base-T twisted pair ports, with RJ point 5 connectors.

AT-SBx81GP24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports, with PoE+.

AT-SBx81GS24a SFP Ethernet Card with 24 slots for 100 or 1000Mbps, fiber optic or twisted pair SFP transceivers.

AT-SBx81XS6 SFP+ Ethernet Card with six slots for 10Gbps, fiber optic SFP+ transceivers, or Twinax direct connect cables.

AT-SBx81XS16 Ethernet Card with sixteen slots for 10Gbps SFP+ transceivers or Twinax direct connect cables.

Figure 14. Ethernet Line Cards

AT-SBx81GT24 Line Card

The AT-SBx81GT24 Line Card, shown in Figure 15, is a Gigabit Ethernet switch.

Figure 15. AT-SBx81GT24 Line Card

Here are the main features of the line card:

- 24 10/100/1000Base-T ports
- RJ-45 connectors
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed and duplex mode
- Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- Port Link/Activity (L/A) LEDs
- 16K entry MAC address table
- 12 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- Hot swappable

The cable requirements for the ports on the AT-SBx81GT24 Line Card are listed in Table 12 on page 54.

LEDs

Each port on the AT-SBx81GT24 Line Card has two LEDs. The LEDs are shown in Figure 16 on page 40 and described in Table 6 on page 40.

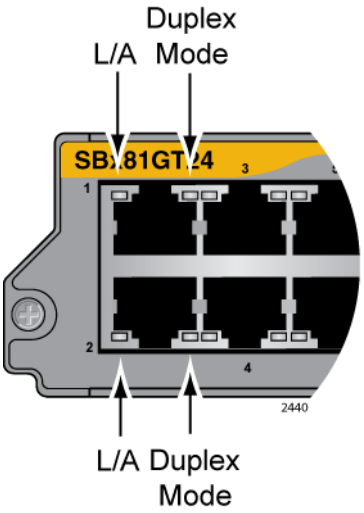


Figure 16. Port LEDs on the AT-SBx81GT24 Line Card

Table 6. Port LEDs on the AT-SBx81GT24 Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
Duplex Mode	Solid Green	The port is operating in full duplex mode.
	Solid Amber	The port is operating in half duplex mode.
	Flashing amber	The port is operating in half duplex mode, with collisions.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81GT40 Line Card

The AT-SBx81GT40 Line Card, shown in Figure 17, is a Gigabit Ethernet switch.

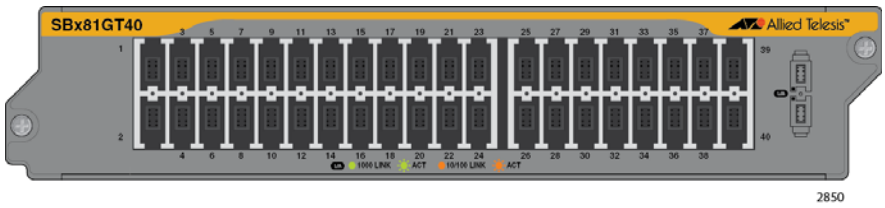


Figure 17. AT-SBx81GT40 Line Card

Here are the main features of the line card:

- 40 10/100/1000Base-T ports
- RJ point 5 connectors
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed
- Full-duplex mode only
- Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 32 Mb buffer memory
- Jumbo frame support:
  - 10240 octets for tagged and untagged traffic between ports on the same line card
  - 10232 octets for untagged traffic between ports on different line cards
  - 10236 octets for tagged traffic between ports on different line cards
- Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- Hot swappable

Note
The ports on the line card do not support half-duplex operation.

The cable requirements for the ports on the AT-SBx81GT40 Line Card are listed in Table 12 on page 54.

LEDs

The LEDs for a port on the AT-SBx81GT40 Line Card are found on the RJ point 5 cable connector. The LEDs are shown in Figure 18.

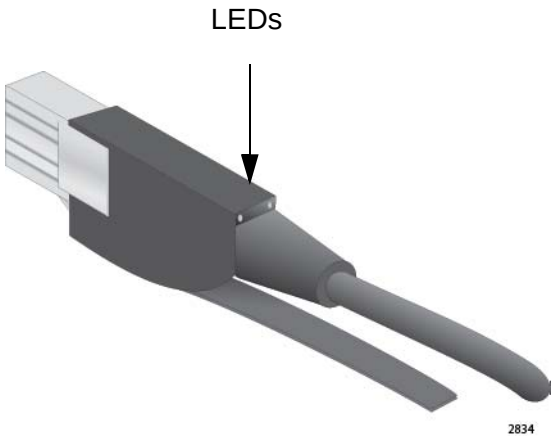


Figure 18. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

Only the left LED is active. Refer to Figure 19. It displays link and activity information about a port. The states of the LED are defined in Table 7 on page 43.

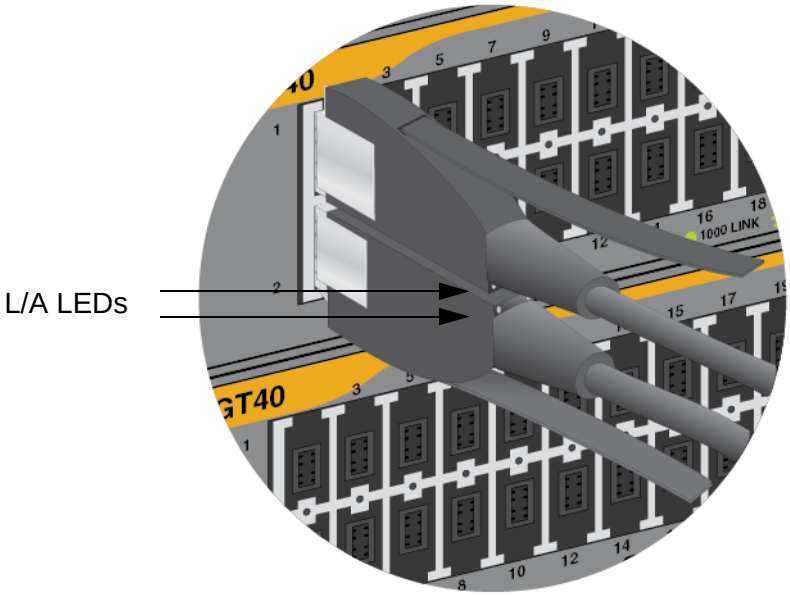


Figure 19. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

Table 7. Port LEDs on the AT-SBx81GT40 Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
Right LED	-	This LED is not used.

AT-SBx81GP24 PoE Line Card

The AT-SBx81GP24 PoE Line Card, shown in Figure 20, is a Gigabit Ethernet switch with Power over Ethernet Plus (PoE+) on all the ports.

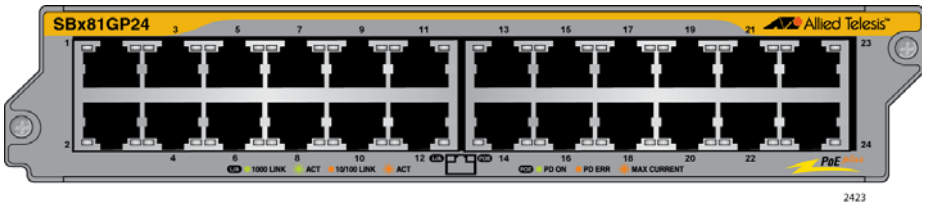


Figure 20. AT-SBx81GP24 PoE Line Card

Here are the main features of the line card:

- 24 10/100/1000Base-T ports
- RJ-45 connectors
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed and duplex mode
- Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- Port Link/Activity (L/A) and PoE+ LEDs
- 16K entry MAC address table
- 12 Mb buffer memory
- PoE+ on all ports
- Up to 30W per port for PoE+
- PoE device classes 0 to 4
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- Hot swappable

The cable requirements of the PoE ports on the AT-SBx81GP24 Ethernet Line Card are listed in Table 13 on page 54.

LEDs

Each port on the AT-SBx81GP24 PoE Line Card has two LEDs. The LEDs are shown in Figure 21 and described in Table 8.

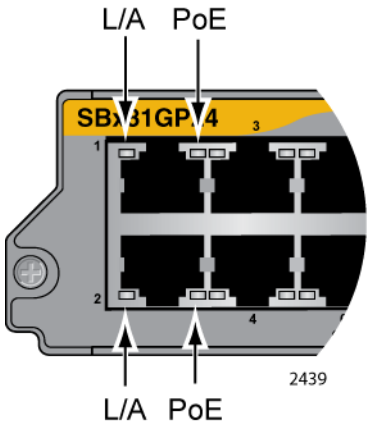


Figure 21. Port LEDs on the AT-SBx81GP24 PoE Line Card

Table 8. Port LEDs on the AT-SBx81GP24 PoE Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.
	Off	The port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
PoE	Green	The switch is detecting a powered device (PD) on the port and is delivering power to it.
	Solid Amber	The switch has shutdown PoE+ on the port because of a fault condition.
	Flashing Amber	The switch is detecting a PD on the port but is not delivering power to it because the maximum power budget has been reached.

Table 8. Port LEDs on the AT-SBx81GP24 PoE Line Card (Continued)

LED	State	Description
PoE	Off	This LED state can result from the following conditions: ❒ The port is not connected to a PD. ❒ The PD is powered off. ❒ The port is disabled in the management software. ❒ PoE is disabled on the port. ❒ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81GS24a SFP Line Card

The AT-SBx81GS24a SFP Line Card, shown in Figure 22, is a Gigabit Ethernet switch.

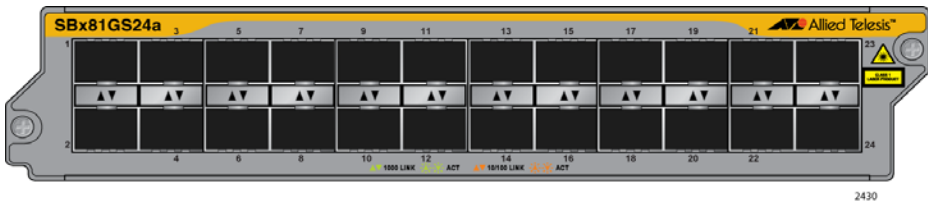


Figure 22. AT-SBx81GS24a SFP Line Card

Here are the main features of the line card:

- 24 slots for small form-factor pluggable (SFP) transceivers
- Supports 100Base-FX and 1000Base-SX/LX fiber optic transceivers
- Supports 100Base-BX and 1000Base-LX bidirectional (BiDi) fiber optic transceivers
- Supports 10/100/1000Base-T and 1000Base-T twisted pair transceivers
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 24 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards.
- Hot swappable

Contact your Allied Telesis sales representative for a list of supported transceivers.

LEDs

The SFP slots on the AT-SBx81GS24a SFP Line Card have one LED each, as shown in Figure 23 on page 48 and described in Table 9 on page 48.

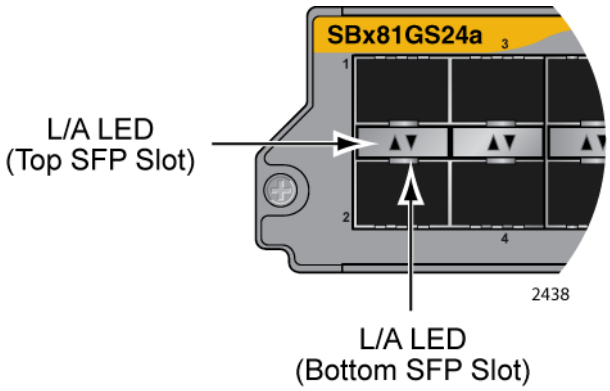


Figure 23. Port LEDs on the AT-SBx81GS24a SFP Line Card

Table 9. Port LEDs on the AT-SBx81GS24a SFP Line Card

LED State	Description
Solid Amber	The SFP transceiver in the slot has established a 10 or 100 Mbps link to a network device.
Blinking Amber	The SFP transceiver is transmitting and/or receiving data at 10 or 100 Mbps.
Solid Green	The SFP transceiver in the slot has established an 1000 Mbps link to a network device.
Blinking Green	The SFP transceiver is transmitting and/or receiving data at 1000 Mbps.
Off	The slot is empty or the SFP transceiver has not established a link to a network device.

AT-SBx81XS6 SFP+ Line Card

The AT-SBx81XS6 Line Card, shown in Figure 24, is a 10Gbps Ethernet switch.

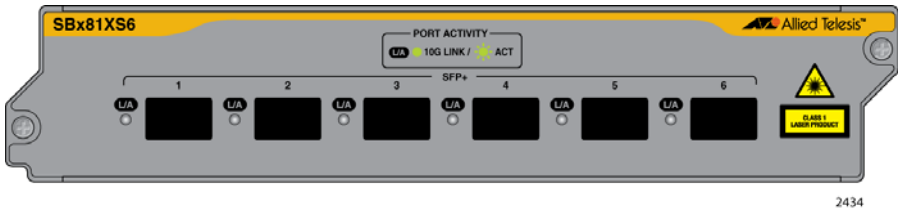


Figure 24. AT-SBx81XS6 Line Card

Here are the main features of the line card:

- Six slots for 10Gbps SFP+ transceivers
- Supports 10GBase-SR/LR fiber optic transceivers
- Supports AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 24 Mb buffer memory
- Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- Hot swappable

Contact your Allied Telesis sales representative for a list of supported transceivers.

LEDs

The AT-SBx81XS6 Line Card has one LED for each SFP+ slot. The LED is shown in Figure 25 and described in Table 10 on page 50.

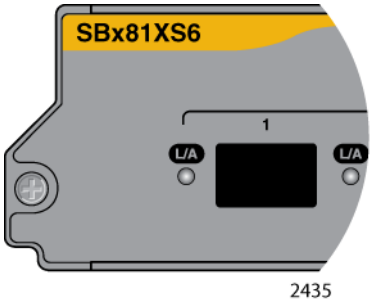


Figure 25. SFP+ Slot LEDs on the AT-SBx81XS6 Line Card

Table 10. SFP+ Slot LEDs on the AT-SBx81XS6 Line Card

LED	State	Description
L/A	Solid Green	The transceiver has established a link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10 Gbps.
	Off	This LED state can result from the following conditions: ❒ The transceiver slot is empty. ❒ The transceiver has not established a link with a network device. ❒ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.

AT-SBx81XS16 SFP+ Line Card

The AT-SBx81XS16 Line Card, shown in Figure 26, is an Ethernet switch that supports 10Gbps SFP+ transceivers.

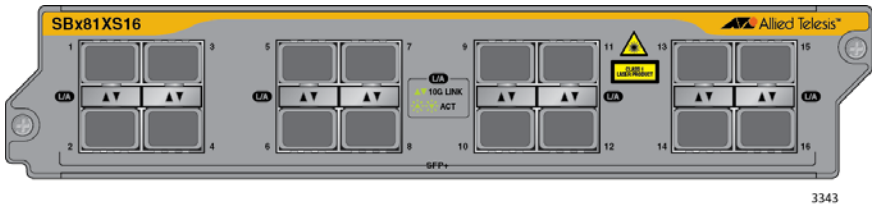


Figure 26. AT-SBx81XS16 Line Card

Here are the main features of the line card:

- Sixteen slots for 10Gbps SFP+ transceivers
- Supports 10GBase-SR/LR fiber optic transceivers
- Supports AT-SP10TW connect twinax cables with SFP+ transceiver-style connectors
- Port Link/Activity (L/A) LEDs
- 32K entry MAC address table
- 32 Mb buffer memory
- Jumbo frame support of up to 10240 bytes
- Hot swappable

Contact your Allied Telesis sales representative for a list of supported transceivers.

Note
The line card is not supported by the AT-SBx81CFC400 Controller Fabric Card.

LEDs

The AT-SBx81XS16 Line Card has one LED for each SFP+ slot. The LED is shown in Figure 27 on page 52 and described in Table 11 on page 52.

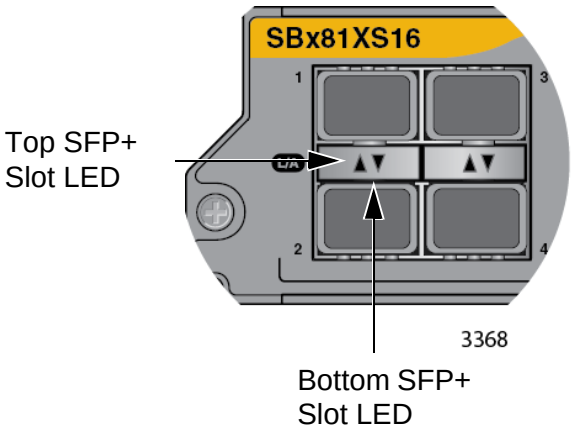


Figure 27. SFP+ Slot LEDS on the AT-SBx81XS16 Line Card

Table 11. SFP+ Slot LEDs on the AT-SBx81XS16 Line Card

LED	State	Description
L/A	Solid Green	The transceiver has established a 10 Gbps link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10 Gbps.
	Off	This LED state can result from the following conditions: ❒ The transceiver slot is empty. ❒ The transceiver has not established a link with a network device. ❒ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.

10/100/1000Base-T Twisted Pair Ports

This section applies to the 10/100/1000Base-T ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 PoE Ethernet Line Cards.

Connector Type

The ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards have 8-pin RJ-45 connectors. The ports on the AT-SBx81GT40 Line Card have 8-pin RJ point 5 connectors. The ports use four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps. The pin assignments are listed in “Port Pinouts” on page 319.

Speed

The ports can operate at 10, 100, or 1000 Mbps. The speeds can be set automatically through Auto-Negotiation, the default setting, or manually with the AlliedWare Plus Operating System.

Note
Twisted-pair ports have to be set to Auto-Negotiation to operate at 1000 Mbps. You cannot manually set twisted-pair ports to 1000 Mbps.

Duplex Mode

The twisted-pair ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards can operate in either half- or full-duplex mode at 10 or 100 Mbps. Ports operating at 1000 Mbps can only operate in full-duplex mode. The twisted-pair ports are IEEE 802.3u-compliant and Auto-Negotiate the duplex mode setting.

You can disable Auto-Negotiation on the ports and set the duplex mode manually.

Note
Switch ports that are connected to 10 or 100 Mbps end nodes that are not using Auto-Negotiation should not use Auto-Negotiation to set their speed and duplex mode settings, because duplex mode mismatches might occur. You should disable Auto-Negotiation and set the speed and duplex mode settings manually with the AlliedWare Plus Operating System.

Note
The ports on the AT-SBx81GT40 Line Card only support full-duplex mode.

Maximum Distance

The ports have a maximum operating distance of 100 meters (328 feet).

Cable Requirements

The cable requirements for the ports on the AT-SBx81GT24 and AT-SBx81GT40 Line Cards are listed in Table 12.

Table 12. Twisted Pair Cable for the AT-SBx81GT24 and AT-SBx81GT40 Line Cards

Cable Type	10Mbps	100Mbps	1000Mbps
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	Yes	No
Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes

Note
Patch cables for the AT-SBx81GT40 Line Card, in lengths of 1 meter and 3 meters with RJ point 5 and RJ-45 connectors, are available from Allied Telesis. Contact your Allied Telesis sales representative for information.

The cable requirements for the PoE ports on the AT-SBx81GP24 Ethernet Line Card are given in Table 13 on page 54.

Table 13. Twisted Pair Cable for the AT-SBx81GP24 Line Card

Cable Type	10Mbps			100Mbps			1000Mbps		
	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	No	No	Yes	No	No	No	No	No

Table 13. Twisted Pair Cable for the AT-SBx81GP24 Line Card (Continued)

Cable Type	10Mbps			100Mbps			1000Mbps		
	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	No	Yes	Yes	No	Yes	No	No
Standard TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Automatic MDIX Detection

The 10/100/1000 Mbps twisted-pair ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards are IEEE 802.3ab compliant and feature automatic MDIX detection when operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to 1000 Mbps.) This feature automatically configures the ports to MDI or MDI-X depending on the wiring configurations of the end nodes.

Ports connected to network devices that do not support automatic MDIX detection default to MDIX.

You may disable automatic MDIX detection on the individual ports and configure the MDI/MDI-X settings manually with the POLARITY command.

Port Pinouts

Refer to Table 40 on page 319 for the pinouts of the twisted-pair ports when they operate at 10 or 100 Mbps in the MDI configuration and Table 41 on page 319 for the MDI-X configuration. For the port pinouts when they operate at 1000 Mbps, refer to Table 42 on page 320.

Power over Ethernet on the AT-SBx81GP24 Line Card

This section applies to the AT-SBx81GP24 PoE Line Card. The twisted-pair ports on the line card support Power over Ethernet (PoE). PoE is a mechanism by which the ports supply power to network devices over the twisted pair cables that carry the network traffic. This feature can simplify network installation and maintenance because it allows you to use the switch as a central power source for other network devices.

Devices that receive their power over Ethernet cables are called powered devices (PD), examples of which include wireless access points, IP telephones, web cams, and even other Ethernet switches. A PD connected to a port on the switch receives both network traffic and power over the same twisted-pair cable.

The AT-SBx81GP24 Line Card automatically determines whether a device connected to a port is a PD. A PD has a signature resistor or signature capacitor that the line card can detect over the Ethernet cabling. If the resistor or capacitor is present, the switch assumes that the device is a PD.

A port connected to a network node that is not a PD (that is, a device that receives its power from another power source) functions as a regular Ethernet port, without PoE. The PoE feature remains enabled on the port but no power is delivered to the device.

Powered Device Classes

The IEEE 802.3af and 802.3at standards define five powered device classes. The classes are defined by the power requirements of the powered devices. The classes are shown in Table 14. The AT-SBx81GP24 Line Card supports all five classes.

Table 14. IEEE802.3af and IEEE802.3at Powered Device Classes

Class	Usage	Maximum Power Output on the PoE Port	PD Power Range
0	Default	15.4W	.044W to 12.95W
1	Optional	4.0W	0.44W to 3.84W
2	Optional	7.0W	3.84W to 6.49W
3	Optional	15.4W	6.49W to 12.95W
4	Optional	30.0W	12.95W to 25.9W

Power Budgeting

The power for PoE on the ports on the AT-SBx81GP24 Line Card is provided by the AT-SBxPWRPOE1 Power Supply. It can provide up to 1200 watts of power for powered devices. You may install up to two power supplies in the chassis for a total of 2400 watts for the powered devices.

The number of powered devices the chassis can support at one time depends on the number of AT-SBxPWRPOE1 Power Supplies in the chassis and the power requirements of the powered devices in your network. Table 15 lists the maximum number of powered devices by class, for one or two power supplies. The numbers assume that the powered devices require the maximum amount of power for their classes.

Note
The maximum number of PoE ports in the SwitchBlade x8106 Switch is 96 ports.

Table 15. Maximum Number of Powered Devices

Class	Maximum Number of Ports with One PoE PSU (1200 W)	Maximum Number of Ports with Two PoE PSU's (2400 W)
0	77	96
1	96	96
2	96	96
3	77	96
4	40	80

PoE Wiring

The IEEE 802.3af and 802.3at standards define two methods for delivering power to powered devices over the four pairs of strands that comprise a standard Ethernet twisted-pair cable. The methods are called Alternatives A and B. In Alternative A, power is supplied to powered devices on strands 1, 2, 3, and 6, which are the same strands that carry the 10/100Base-TX network traffic. In Alternative B, power is delivered on strands 4, 5, 7, and 8. These are the unused strands.

Note
1000BASE-T cables carry the network traffic on all eight strands of the Ethernet cable.

The PoE implementation on the AT-SBx81GP24 Line Card is Alternative A. Power is transmitted on strands 1, 2, 3, and 6. Thus, the line card can

support PDs that receive power using Alternative A.

PDs that comply with the IEEE 802.3af and 802.3at standards are required to support both power delivery methods. However, non-standard PDs and PDs that were manufactured before the completion of the IEEE 802.3af and 802.3at standards and that support only Alternative B will not work with the AT-SBx81GP24 PoE Line Card.

Chapter 3

AT-SBx81CFC960 Controller Fabric Card

This chapter describes the AT-SBx81CFC960 Controller Fabric Card in the following sections:

- ❒ “Hardware Components” on page 60
- ❒ “Guidelines” on page 62
- ❒ “Dual Controller Cards” on page 64
- ❒ “SYS Status LEDs” on page 66
- ❒ “eco-friendly Button” on page 68
- ❒ “SBx Linecard Status LEDs” on page 69
- ❒ “SFP+ Slots” on page 70
- ❒ “Console (RS-232) Port” on page 72
- ❒ “Ethernet Management Port (NET MGMT)” on page 73
- ❒ “USB Port” on page 75
- ❒ “Reset Button” on page 76
- ❒ “AlliedWare Plus Software Releases for the Hardware Components” on page 78

Note
The AT-SBx81CFC960 Controller Fabric Card requires version 5.4.4 or later of the AlliedWare Plus operating software. The controller card does not support earlier versions of the operating software.

Hardware Components

The components on the controller card are identified in Figure 28 and briefly described in Table 16.

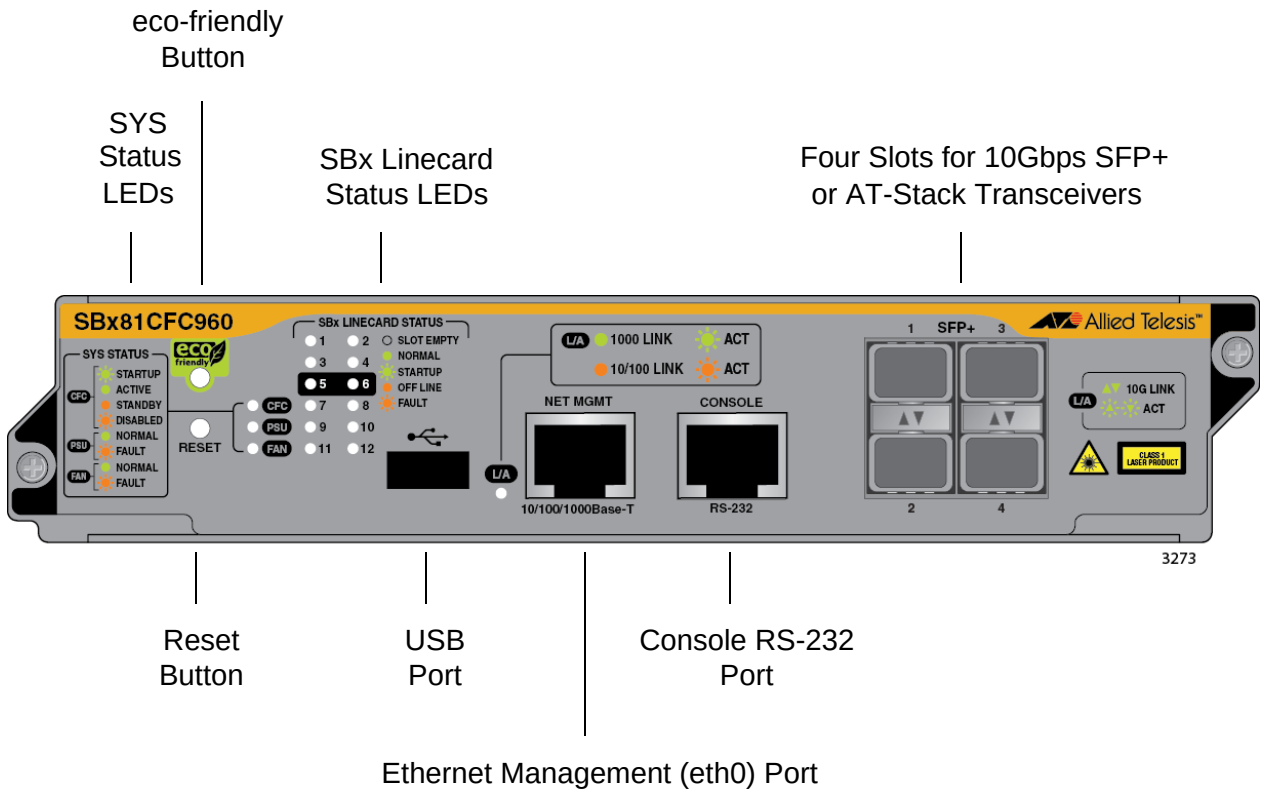


Figure 28. AT-SBx81CFC960 Controller Fabric Card

Table 16. Components on the AT-SBx81CFC960 Controller Fabric Card

Component	Description
SYS Status LEDs	Displays general status information about the controller card, power supplies, and fan module. For more information, refer to “SYS Status LEDs” on page 66.
eco-friendly Button	Turns the LEDs on and off. For more information, refer to “eco-friendly Button” on page 68.
SBx Linecard Status LEDs	Displays general information about the controller and Ethernet line cards. For more information, refer to “SBx Linecard Status LEDs” on page 69.

Table 16. Components on the AT-SBx81CFC960 Controller Fabric Card

Component	Description
Slots for 10Gbps SFP+ Transceivers	Supports four 10Gbps SFP+ transceivers for uplink ports for the Ethernet line cards or AT-Stack transceivers for the VCStack Plus feature. The transceivers are ordered separately. For a list of supported transceivers, refer to the Allied Telesis web site. For more information, refer to “SFP+ Slots” on page 70.
Console RS-232 Port	Provides local management of the switch. The switch does not require an IP address for local management. For more information, refer to “Console (RS-232) Port” on page 72.
NET MGMT (eth0) Port	Provides maintenance access to the controller card. For more information, refer to “Ethernet Management Port (NET MGMT)” on page 73.
USB Port	Used with a USB flash memory drive for management functions, such as storing backup copies of the switch configuration and transferring configurations between switches. For more information, refer to “USB Port” on page 75.
Reset Button	Resets the controller and Ethernet line cards. For more information, refer to “Reset Button” on page 76.

Guidelines

Here are a few functions of the controller card:

- Chassis Management — The controller card is used to monitor and configure the parameter settings on the Ethernet line cards. The controller card supports local management sessions through the Console RS-232 port and remote management sessions with Telnet, Secure Shell (SSH), or SNMP clients on workstations on your network.
- Management software — The controller card stores its own management software as well as the management software for the Ethernet line cards. It downloads the firmware to the cards over the backplane in the chassis when the chassis is powered on or reset, as part of the initialization process.
- Configuration Settings — The controller card also maintains a configuration database in which it stores its own settings as well as the settings of the Ethernet line cards. When a change is made to a configuration setting on a line card, the controller card transmits the change over the backplane to the appropriate line card and updates its configuration database. The database is retained even when the chassis is powered off because controller card stores it in nonvolatile memory. You may download the database to a management workstation or network server to maintain a history of configurations or to transfer a configuration to multiple chassis.
- Backplane Control — The chassis has a backplane. The Ethernet line cards use the backplane to forward traffic to each other when the ingress and egress ports of packets are located on different cards. The backplane is managed by the controller card. The bandwidth of the backplane depends on the number of controller cards in the chassis. Each line card slot has up to 80Gbps of backplane bandwidth when the chassis has one controller card and up to 160Gbps with two controller cards.
- VCStack Plus feature — The controller card can be used to create a stack of two chassis that operate as a single, virtual switch, which can simplify network operation and management. For more information, refer to Chapter 14, “VCStack Plus Overview” on page 269.
- SFP+ slots — The SFP+ slot on the front panel may be used with standard 10Gbps transceivers to add high speed uplink ports for the Ethernet line cards in the chassis or with stacking transceivers and the VCStack Plus feature to build a stack of two chassis.

Here are the guidelines to the controller card:

- The chassis must have at least one controller card. The line cards do not forward traffic if the chassis does not have at least one

controller card.

- The chassis may have either one or two controller cards.
- Two controller cards are recommended for redundancy and to increase the per slot backplane bandwidth from 40 to 80Gbps.
- The controller cards are installed in slots 5 and 6 in the chassis.

Here are other features of the controller card:

- LEDs for monitoring the status of the Ethernet line cards.
- Power-saving eco-friendly button for turning the port and status LEDs on and off on the line cards and control cards.
- Reset switch for resetting the chassis.
- SD card slot for data storage and retrieval.
- Console RS-232 for local management.
- NET MGMT port and inband interface for remote Telnet, SSH, and SNMP management.
- Hot swappable.

Dual Controller Cards

You may install either one or two controller cards in the chassis. Here are the advantages to having two controller cards in the chassis.

- Having a second controller card improves the performance of the chassis by increasing the backplane bandwidth for the Ethernet line cards. Two controller cards provide up to 160Gbps non-blocking throughput for each line card.
- Installing a second controller card adds redundancy. If a controller card fails in the chassis, the second card enables the Ethernet line cards to maintain network operations.
- Installing a second controller card adds four additional SFP+ slots.

Here are the guidelines to dual controller cards:

- One card operates as the active master card and the other as the inactive master card. You can determine the state of a controller card by the M/S LED. For information, refer to “SYS Status LEDs” on page 66.
- The controller cards automatically determine their states when the chassis is powered on or reset. The card that boots up first is designated as the active master card. If both cards boot up at the same time, the card in slot 5 is designated as the active master card.
- All management sessions have to be conducted through the active controller card.
- To establish a local management session, you have to use the Console RS-232 port on the active controller card.
- When the chassis is powered on or reset, the two controller cards perform an initialization process, part of which involves the inactive card synchronizing its management files with the active card. During this phase of the initialization process, which may take several minutes, the inactive card does not participate with the active card in forwarding traffic over the backplane and its SFP+ slots are nonfunctional. After the inactive card has finished the initialization process, it joins with the active card in forwarding traffic on the backplane and activates its SFP+ slots. For more information, refer to “Monitoring the Initialization Process” on page 205.

Two controller cards provide an active/active architecture. The packet processors on both controller cards are fully utilized, doubling the available backplane bandwidth to up to 160 Gbps per line card slot.

One of the controller cards becomes the active master. In normal operations, this is the controller card in slot 5. The active master manages the system and processes CPU bound network traffic. The standby master runs all network protocol modules and is kept in sync with the active master card, so as to be available in hot-standby for near instantaneous fail over, if required.

If the active master card is hot-swapped out, the standby master becomes the active master. It takes over all control functions almost instantaneously. Testing has shown no noticeable disruption to streaming video.

You can determine the state of the controller card by viewing the CFC LED on the card. The controller card is the active master when the LED is solid green and the standby master when the LED is solid amber.

SYS Status LEDs

The SYS (System) Status LEDs on the controller fabric card display general status information about the controller card, power supplies, and fan module. The LEDs are defined in Table 17.

Table 17. SYS (System) Status LEDs

LED	State	Description
CFC	Solid Green	Indicates that the AT-SBx81CFC960 Controller Fabric Card is operating normally as the active master controller card.
	Flashing Green	Indicates that the controller card is initializing its management software or synchronizing its database with the active master controller card.
	Solid Amber	Indicates that the controller card is operating normally as the standby master controller card.
	Flashing Amber	Indicates that the controller card is disabled. An active master controller card might disable a standby master controller card if the two cards have incompatible versions of the management software and are unable to resolve the problem, possibly because of insufficient free flash memory.
PSU	Solid Green	Indicates that the power supplies are operating properly.
	Flashing Amber	Indicates that a power supply is experiencing a problem. Possible causes are: ❒ The input AC voltage from a power source is not within the normal operating range of a power supply module. ❒ The output DC voltage from a power supply module to the line cards is not within the normal operating range. ❒ A power supply is experiencing high temperature. ❒ A power supply has failed. Check the status LEDs on the individual power supply modules to determine which module has a fault condition.

Table 17. SYS (System) Status LEDs (Continued)

LED	State	Description
FAN	Solid Green	Indicates that the fan module is operating properly.
	Flashing Amber	Indicates that the fan module has a problem. The fans are operating below the normal operating range or have stopped.

eco-friendly Button

You may use the eco-friendly button on the controller card to turn the LEDs on or off. You may turn off the LEDs when you are not using them to monitor the control and Ethernet line cards, to conserve electricity. When the LEDs are off, the overall power consumption of the chassis is slightly reduced, approximately 3 watts in a system with 240 active copper ports.

The button controls all of the port LEDs on the Ethernet line cards and controller card, except for the CFC LED, which is always on, and the L/A LED for the NET MGMT port. The button does not control the LEDs on the fan module and power supply systems.

SBx Linecard Status LEDs

The SBx Linecard Status LEDs display general status information about the Ethernet line cards and controller cards. There are twelve LEDs, numbered 1 to 12. Only LEDs 1 to 6 are used. They correspond to slots 1 to 6 in the AT-SBx8106 Chassis. LEDs 7 to 12 are not used. If the chassis has two controller cards, the SBx Status LEDs on both cards are active. The LEDs are defined in Table 18.

Table 18. SBx Linecard Status LEDs

LEDs	State	Description
1 to 12	Off	Indicates that the slot is empty.
	Solid Green	Indicates that the Ethernet line or controller card is operating normally.
	Flashing Green	Indicates that the card is booting up, running in test mode, or loading its configuration settings.
	Solid Amber	Indicates that the card is in an off-line state. Possible causes are: ❒ An Ethernet line card with this LED state may have encountered a problem initializing the management software. ❒ An Ethernet line card that displays this LED state might not be able to boot up because the controller card does not have the appropriate load file and needs to be updated to the most recent release of the AlliedWare Plus Operating System. ❒ A standby master controller card that displays this LED state may have been disabled by the active master controller card because they have incompatible versions of the AlliedWare Plus Operating System and were unable to resolve the problem, possibly because of insufficient free flash memory. You may remove a line or controller card from the chassis when it is in this state.
	Flashing Amber	Indicates that the card is reporting a fault condition. Use the management commands to determine the specific problem.

SFP+ Slots

The controller card has four SFP+ slots on the front panel. The slots are numbered 1 to 4 and have the following functions.

- The slots may be used with standard 10Gbps transceivers to add high speed uplink ports to the Ethernet line cards in the chassis. For a list of supported transceivers, refer to the Allied Telesis web site.
- The slots may be used with AT-Stack transceivers and the VCStack Plus feature to create a stack of two chassis that operate as a single, virtual switch. For more on stacking, refer to Chapter 14, “VCStack Plus Overview” on page 269.

Here are the SFP+ slot guidelines:

- The slots on the controller card support standard 10Gbps transceivers when the VCStack Plus feature is disabled, which is the default setting.
- The slots support only AT-Stack transceivers when the VCStack Plus feature is enabled.
- The slots do not support combinations of standard 10Gbps and stacking transceivers.
- When a chassis has two controller cards, the SFP+ ports on both cards are active. Consequently, a chassis with two controller cards has eight active SFP+ slots. This is true whether you are using the slots with standard 10Gbps transceivers to add high speed uplink ports to the chassis or with AT-Stack transceivers and the VCStack Plus feature to build a stack of two chassis.
- You may use the slots in any order when you are using them with standard 10Gbps transceivers.
- The cabling configurations for the SFP+ slots and stacking transceivers are given in “Cabling Configurations for the Stacking Transceivers” on page 273.

Each SFP+ slot has one LED. The states of the LED are described in Table 19.

Table 19. LEDs for the SFP+ Slots on the AT-SBx81CFC960 Controller Card

LED	State	Description
L/A	Solid Green	The transceiver has established a link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10Gbps.
	Off	The slot is empty or the transceiver has not established a link with a network device.

Console (RS-232) Port

The Console Port is used to conduct local management sessions with the switch. Local management sessions are established with a terminal or PC with a terminal emulation program, and the management cable that comes with the card.

Local management is referred to as out-of-band management because it is not conducted over a network. Consequently, the AT-SBx81CFC960 Controller Fabric Card does not need an Internet Protocol (IP) address for this type of management.

Your initial management session with the switch must be a local management session. For instructions on how to start a local management session, refer to “Using Local Management to Verify the Chassis” on page 212 or the Software Reference for SwitchBlade x8100 Series Switches.

Ethernet Management Port (NET MGMT)

The controller card uses the NET MGMT port as a separate routed eth0 interface. The interface is not part of the switching matrix of the Ethernet line cards, but the CPU on the controller card can route traffic in or out of the port from the line cards.

Here are the guidelines to using the port:

- The port should only be used for initial configuration and maintenance access to the chassis.
- If the chassis has two controller cards, you must use the NET MGMT port on the active controller card to access the switch. The NET MGMT port on the standby controller card is inactive. To determine the status of the controller cards, refer to the CFC LEDs, described in Table 17 on page 66.
- The NET MGMT port has a standard RJ-45 8-pin connector and operates at 10, 100, or 1000 Mbps in either half- or full-duplex mode.
- The cable requirements for the port are the same as the ports on the AT-SBx81GT24 Line Card, listed in Table 12 on page 54. For the port pinouts, refer to “Port Pinouts” on page 319.
- The default setting for the port is Auto-Negotiation, which sets the speed and duplex mode automatically. You may disable Auto-Negotiation and configure the port manually.
- The wiring configuration of the NET MGMT port is set automatically with automatic MDIX detection. You may disable automatic MDIX detection and set the wiring configuration manually.
- The port is referred to as eth0 in the management software.

For instructions on how to configure the NET MGMT port, refer to the Software Reference for SwitchBlade x8100 Series Switches.

NET MGMT LED

The Network Management (NET MGMT) port on the AT-SBx81CFC960 Controller Fabric Card has one Status LED, described in Table 20 on page 74.

Table 20. NET MGMT Port LED

LED	State	Description
L/A	Solid Green	The port has a valid 1000 Mbps link.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has a valid 10 or 100 Mbps link.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.
	Off	The port has not established a link to a network device.

USB Port

The USB port supports a flash drive. You may use a flash drive to perform the following management functions:

- Use Allied Telesis Management Framework to provide a centralized network backup location.
- Store backup copies of the configuration files on the AT-SBx81CFC960 Controller Fabric Card.
- Transfer configuration files between controller cards in different chassis that are to have similar configurations.
- Transfer release and GUI files between controller cards.
- Store or transfer log files.
- Store or transfer debug files (for example, the output of the SHOW TECH-SUPPORT command).
- Boot the AlliedWare Plus Operating System and master configuration file from flash drive.

The port is compatible with USB v1.0 and v2.0 flash drives. Operating the controller card with a flash drive is optional.

Reset Button

You may use the Reset button to reset either the controller card or all of the cards in the chassis. The action depends on the number of AT-SBx81CFC960 Controller Cards in the chassis and, if the chassis has two controller cards, whether you reset the active or standby master controller card.

The possible actions are described here:

- If the chassis has only one controller card, pressing the Reset button resets the controller card and all of the Ethernet line cards in the chassis. You may perform this function if the chassis and line cards are experiencing a problem.

Caution
The controller and Ethernet line cards do not forward network traffic for about three minutes while they initialize the AlliedWare Plus Operating System and configure their parameter settings. Some network traffic may be lost.

- If the chassis has two controller cards, pressing the Reset button on the active master controller card resets the controller card, but not the Ethernet line cards. The standby master controller card immediately becomes the new active master card and the Ethernet line cards continue to forward traffic. The reset controller card is unavailable for about two minutes while it initializes its AlliedWare Plus Operating System, after which it becomes the standby master controller card in the chassis.

Note
The available bandwidth of the backplane in the chassis is reduced for about one minute while the reset controller card initializes its management software. This may reduce network performance.

- If the chassis has two controller cards, pressing the Reset button on the standby master controller card resets that card, but not the active master controller card or the Ethernet line cards.

Note
The available bandwidth of the backplane in the chassis is reduced for about one minute while the standby master controller card initializes its management software and synchronizes its database with the active master controller card. This may reduce network performance.

Note
To reset individual line cards in the chassis, use the REBOOT or RELOAD command in the AlliedWare Plus Operating System.

AlliedWare Plus Software Releases for the Hardware Components

Table 21 lists the releases of the AlliedWare Plus Operating System for the hardware components of the SwitchBlade x8106 product.

Table 21. AlliedWare Plus Operating System Releases for the Hardware Components

Model Number	Initial Release
AT-SBx8106 Chassis	5.4.2
AT-SBx81GT24 Line Card	5.4.2
AT-SBx81GT40 Line Card	5.4.3
AT-SBx81GP24 Line Card	5.4.2
AT-SBx81GS24a Line Card	5.4.2
AT-SBx81XS6 Line Card	5.4.2
AT-SBx81XS16 Line Card	5.4.4
AT-SBx81CFC960 Controller Card	5.4.4
AT-SBxPWRSYS1 AC System Power Supply	5.4.2
AT-SBxPWRPOE1 PoE Power Supply	5.4.2
AT-SBxPWRSYS1 DC System Power Supply	5.4.3
AT-SBxFAN12 Fan Module	5.4.2

Section II

Installing the Chassis

This section contains the following chapters:

- Chapter 4, “Safety Precautions and Site Requirements” on page 81
- Chapter 5, “Installing the Chassis in an Equipment Rack” on page 89
- Chapter 6, “Installing the Power Supplies” on page 107
- Chapter 7, “Installing the AT-SBx81CFC960 Controller and Ethernet Line Cards” on page 127
- Chapter 8, “Installing the Transceivers and Cabling the Ports” on page 143
- Chapter 9, “Powering On the Chassis” on page 171
- Chapter 10, “Verifying the Hardware Operations of the Chassis” on page 209
- Chapter 11, “Troubleshooting” on page 215
- Chapter 12, “Replacing Modules” on page 231
- Chapter 13, “Upgrading the Controller Fabric Card” on page 259

Chapter 4

Safety Precautions and Site Requirements

This chapter contains the safety precautions and guidelines for selecting a site for the chassis. The chapter contains the following sections:

- “Reviewing Safety Precautions” on page 82
- “Selecting a Site for the SwitchBlade x8106” on page 86
- “Installation Tools and Material” on page 88

Reviewing Safety Precautions

Please review the following safety precautions before you begin to install the switch.

Note
The ✍ indicates that a translation of the safety statement is available for viewing in portable document format (PDF) titled **Translated Safety Statements** from our web site at **www.alliedtelesis.com/support**.

Warning
Class 1 Laser product. ✍ L1

Warning
Do not stare into the laser beam. ✍ L2

Warning
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ✍ E1

Warning
Do not work on equipment or cables during periods of lightning activity. ✍ E2

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ✍ E3

Warning
Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts. ✍ E4

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

Caution
Air vents must not be blocked and must have free access to the room ambient air for cooling. E6

Warning
Operating Temperature. This product is designed for a maximum ambient temperature of 40° degrees C. E7

Note
All Countries: Install product in accordance with local and National Electrical Codes. E8

Warning
When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. E11

Caution
Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E21

Caution
Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur. E22

Warning
Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading. E25

Warning
The AT-SBxFAN06 Fan Module has hazardous moving parts. Keep fingers away from moving fan blades.

Warning
Remove all metal jewelry, such as rings and watches, before installing or removing a line card from a powered-on chassis. E26

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E28

Warning
This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit. E30

Note
If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra). E35

Caution
Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. E36

Warning
Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips). E37

Warning
To reduce the risk of electric shock, the PoE ports on this product must not connect to cabling that is routed outside the building where this device is located. E40

Warning
This product may have multiple AC power cords installed. To de-energize this equipment, disconnect all power cords from the device. E43

Caution
An Energy Hazard exists inside this equipment. Do not insert hands or tools into open chassis slots or sockets. E44

Warning
This equipment shall be installed in a Restricted Access location. E45

Warning
High Leakage Current exists in this chassis. Connect external ground wire before connecting AC power supply(s). E46

Selecting a Site for the SwitchBlade x8106

Please perform the following procedure to determine the suitability of the site for the chassis:

1. Verify that the equipment rack is safely secured so that it will not tip over. You should install devices starting at the bottom of the rack, with the heavier devices near the bottom.

2. Verify that the power outlets for the chassis are located near the unit and are easily accessible.

3. Verify that the power sources are on different A/C circuits to protect the unit from a power circuit failure.

4. Verify that the site has dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.

5. Verify that the site allows for easy access to the ports on the front of the chassis so that you can easily connect and disconnect the network cables, as well as view the unit's LEDs.

6. Verify that the site allows for adequate air flow around the unit and through the cooling vents. The ventilation direction for the main section of the chassis is from left to right (when facing the front of the chassis), with the fan module drawing air out of the chassis. The power supplies have fans that draw air from the front to the back.

7. Verify that the site has a reliable and earth (grounded) power supply source, preferably dedicated and filtered.

8. Verify that the twisted pair cabling is not exposed to sources of electrical noise, such as radio transmitters, broadband amplifiers, power lines, electric motors, and fluorescent fixtures.

9. Verify that the site protects the chassis from moisture, water, and dust.

Here are other guidelines to consider:

- Switch ports are suitable for intra-building connections, or where non-exposed cabling is required.
- Do not place objects on top of the chassis.
- The power cords provided with the AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies for 100-125 VAC installations have 20 Amp, 125 V NEMA 5-20P plugs. The plugs are only compatible with NEMA 5-20R receptacles. See Figure 29 on page 87.

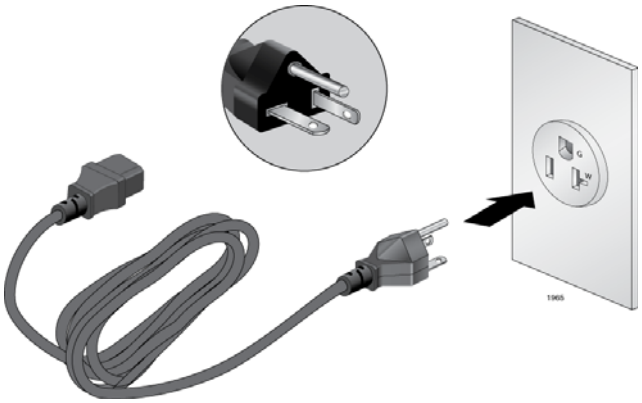


Figure 29. 100 - 125 VAC 125 V NEMA 5-20 Plug and Receptacle

Installation Tools and Material

Here are the installation tools and material you need to have to install the product.

Installing the chassis in an equipment rack requires the following items:

- #2 Phillips-head screwdriver
- Six equipment rack screws
- Flat-head screwdriver
- #2 Phillips-head 10 inch-lbs torque screwdriver (optional)

The grounding wire requires the following items:

- #2 Phillips-head screwdriver
- Crimping tool
- 10 AWG stranded grounding wire
- #2 Phillips-head 20 inch-lbs torque screwdriver (optional)

The AT-SBxPWRSYS1 DC Power Supply requires the following items:

- Two 8 AWG power wires
- One 10 AWG stranded grounding wire
- 8 mm wrench
- #1 Phillips-head screwdriver
- #3 Phillips-head screwdriver
- #3 Phillips-head 30 to 40 inch-lbs torque screwdriver (optional)

The AT-SBx81CFC960 Controller Fabric Card and Ethernet line cards require the following items:

- #2 Phillips-head screwdriver
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional)

Chapter 5

Installing the Chassis in an Equipment Rack

This chapter describes how to install the AT-SBx8106 Chassis in an equipment rack. This chapter contains the following sections:

- ❒ “Required Tools and Material” on page 90
- ❒ “Preparing the Equipment Rack” on page 91
- ❒ “Unpacking the AT-SBx8106 Chassis” on page 94
- ❒ “Removing the Rubber Feet” on page 96
- ❒ “Adjusting the Equipment Rack Brackets” on page 98
- ❒ “Installing the Chassis in the Equipment Rack” on page 100
- ❒ “Removing the Shipping Brace” on page 104
- ❒ “Installing the Chassis Grounding Wire” on page 105

Required Tools and Material

Here is a list of the tools and screws for mounting the chassis in an equipment rack:

- ❒ #2 Phillips-head screwdriver
- ❒ Six equipment rack screws
- ❒ Flat-head screwdriver
- ❒ #2 Phillips-head 10 inch-lbs torque screwdriver (optional)

Here is a list of the tools and wire for installing the grounding wire on the chassis:

- ❒ #2 Phillips-head screwdriver
- ❒ Crimping tool
- ❒ 10 AWG stranded grounding wire
- ❒ #2 Phillips-head 20 inch-lbs torque screwdriver (optional)

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E30

Preparing the Equipment Rack

This section explains how to prepare the equipment rack for the chassis. The procedure requires the following items:

- #2 Phillips-head screwdriver (not provided)
- Two equipment rack screws (not provided)

To prepare the equipment rack for the AT-SBx8106 Chassis, perform the following procedure:

Caution
The chassis is heavy and should be mounted as low as possible in the equipment rack to maximize vertical stability.

1. Reserve 190.0 mm (7.5“) of vertical rack space for the installation of the AT-SBx8106 Chassis, as shown in Figure 30 on page 92.

2. Do not mount any equipment within 152.4 mm (6”) above this space during installation. This additional vertical space is temporary and allows you enough room to lift and tilt the chassis into its position in the equipment rack without striking other equipment. You may use this additional space for other network equipment after the chassis is installed.

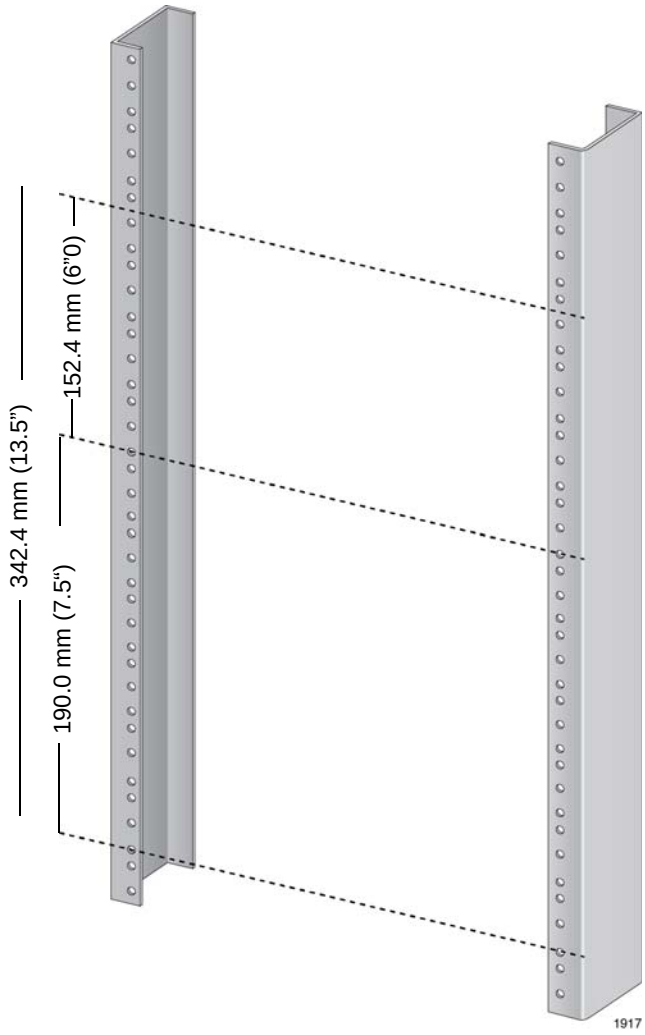


Figure 30. Reserving Vertical Rack Space

3. Identify the lowest 1/2” screw hole pattern on the rack mounting rails within the space reserved for the AT-SBx8106 Chassis.

4. Install one rack mount screw in each vertical rail, at the same height in the top screw hole of the lowest 1/2” hole pattern, as shown in Figure 31. The screws are used to support the chassis while you secure it to the rack. Do not fully tighten the screws at this time. The screw heads should protrude from the rack approximately 6.4 mm (.25 in).

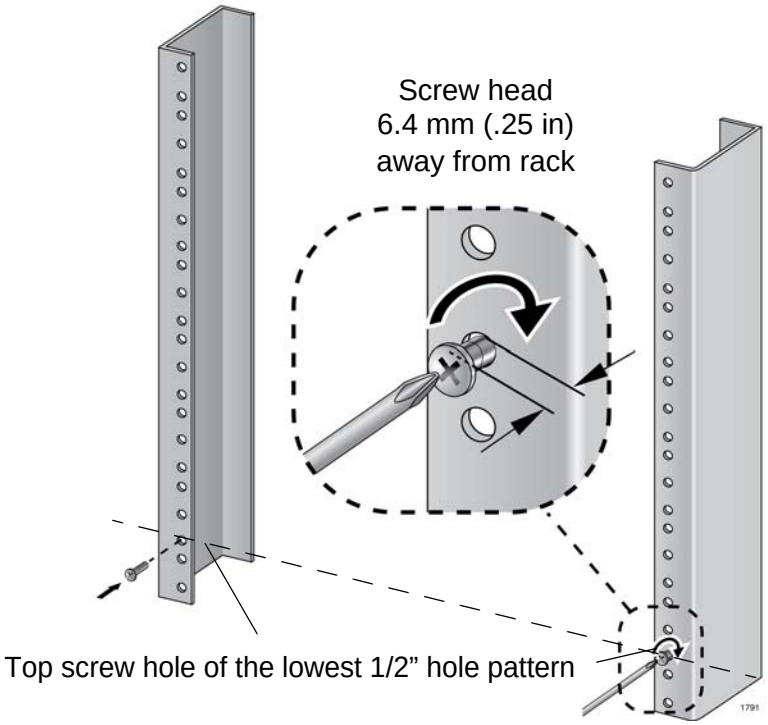


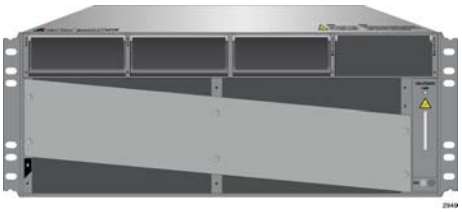
Figure 31. Rack Mounting Hole Locations

5. After installing the two screws in the equipment rack, go to “Unpacking the AT-SBx8106 Chassis” on page 94.

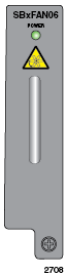
Unpacking the AT-SBx8106 Chassis

To unpack the AT-SBx8106 Chassis, perform the following procedure:

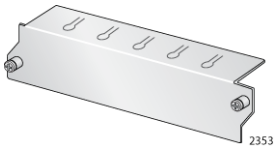
1. Remove all components from the shipping package.
2. Verify the contents of the shipping container by referring to Figure 32 here and Figure 33 on page 95. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBx8106 Chassis



One AT-SBxFAN06 Module pre-installed in the vertical slot on the right side of the front panel



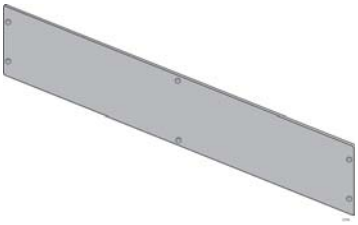
Four blank line card slot covers

Three blank power supply slot covers pre-installed in power supply slots A to C on the front panel

One grounding lug pre-installed in the lower left corner on the back panel

Figure 32. Components of the AT-SBx8106 Chassis

Two equipment rack brackets pre-installed on the sides of the chassis.



One shipping brace pre-installed diagonally across the line card slots on the front panel

One wrist strap

Figure 33. Components of the AT-SBx8106 Chassis (Continued)

Removing the Rubber Feet

The chassis comes with rubber feet on the base panel for tabletop installation, which is not recommended for this product. Allied Telesis recommends removing the feet before installing the chassis in the equipment rack. To remove the rubber feet, perform the following procedure:

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when lifting the chassis.

Note
Do not remove the shipping brace from the front of the chassis until after the unit is installed in the equipment rack. You might bend the chassis and cause misalignment of the slots and card guides if you lift the chassis without the shipping brace.

1. Place the unit upside down on a level, secure surface, as shown in Figure 34.

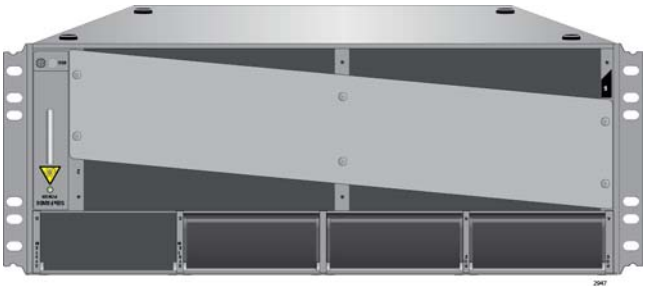


Figure 34. Turning the Chassis Upside Down

2. Using a flat-head screwdriver, pry the rubber feet from the bottom of the chassis, as shown in Figure 35 on page 97.

Figure 35. Removing the Rubber Feet

3. Turn the chassis over.

Go to the next procedure, “Adjusting the Equipment Rack Brackets” on page 98.

Adjusting the Equipment Rack Brackets

The chassis has two pre-installed equipment rack brackets. You may adjust the brackets so that the front of the chassis is flush with, extends beyond, or is recessed behind the front of the equipment rack. You may also install the brackets so that the rear panel of the chassis is flush with the front of the equipment rack.

You adjust the brackets by removing them and re-installing them in different positions on the sides of the chassis. The bracket positions are listed in Table 22 and illustrated in Figure 36 on page 99 and Figure 37 on page 99. Please review the following information before moving the brackets:

- ❒ Position A, the default position, positions the chassis so that the front of the unit is flush with the front of the equipment rack.
- ❒ Position B recesses the front of the chassis by 27.39 mm (1.1 in).
- ❒ Positions C to E extend the front of the chassis beyond the front of the rack from 27.39 mm (1.1 in) to 140.85 mm (5.545 in).
- ❒ Position F installs the chassis with the rear panel flush with the front of the equipment rack.
- ❒ To install the rack mount brackets in position “E,” you have to remove the two chassis screws from the bottom-middle section of the chassis and re-install them in front where the rack mount bracket screws were originally, as shown in Figure 36 on page 99.
- ❒ The dimension (X) between the front panel and the rack rails is given for each rack mounting bracket position in Table 22.

Table 22. Front Panel to Rack Rail Dimensions

Figure #	Front Panel Position	Dimension X Front Panel to Rack Rail
36	A (Factory Installed - Flush)	3.69 mm (0.145 in)
36	B (Recessed)	-27.39 mm (-1.078 in)
36	C	27.39 mm (1.078 in)
36	D	47.71 mm (1.878 in)
36	E	140.85 mm (5.545 in)
37	F (Reverse Position)	374.16 mm (14.731 in)

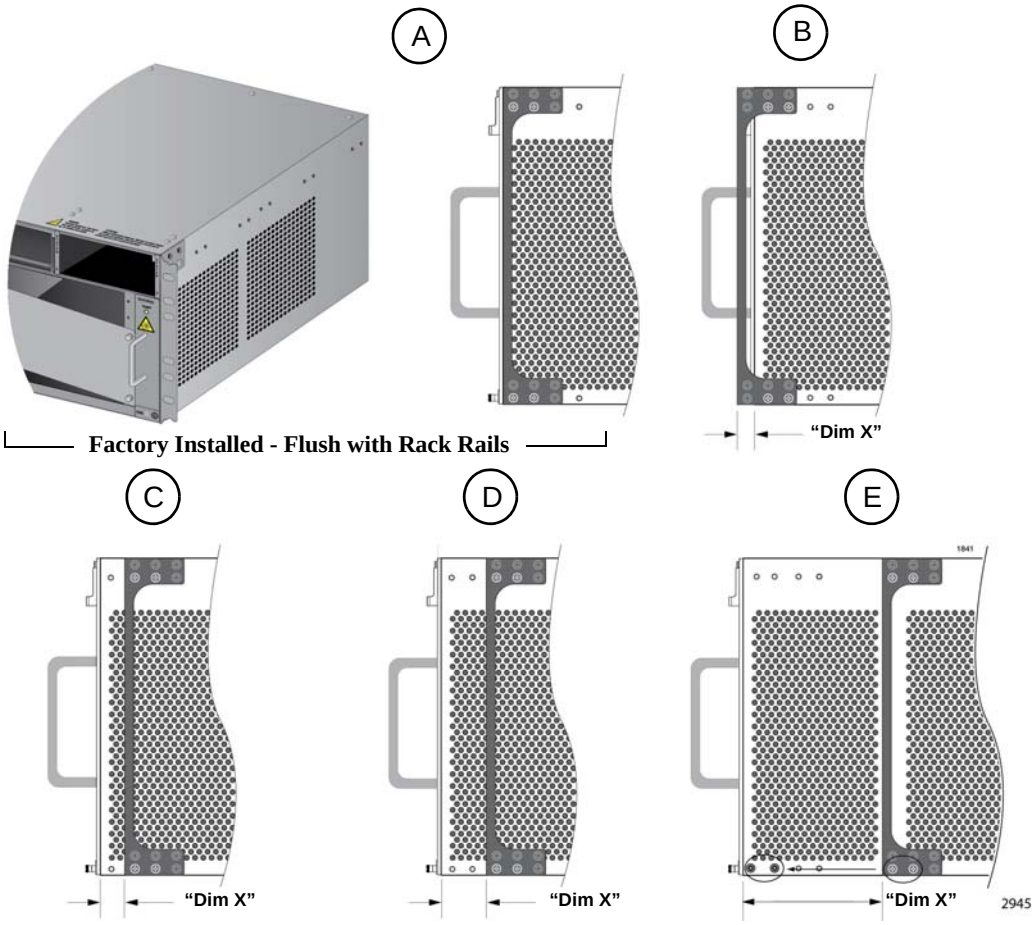
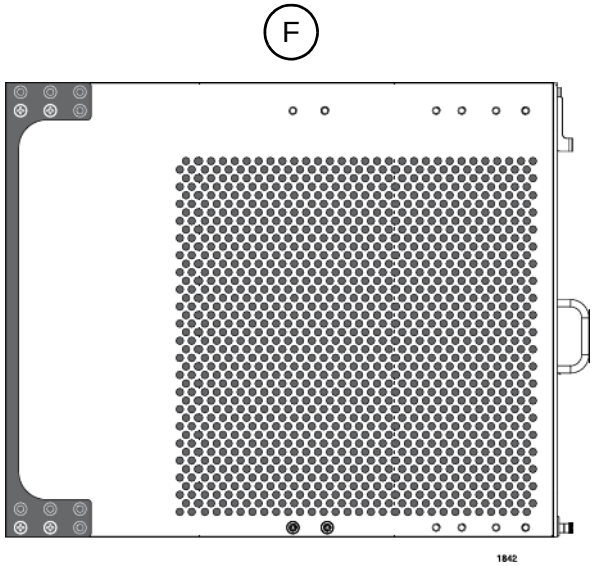


Figure 36. Rack Mounting Bracket Locations



Front panel facing towards the rear of the equipment rack.

Figure 37. Rack Bracket Locations for Reverse Position of Chassis

Installing the Chassis in the Equipment Rack

The procedure in this section explains how to install the chassis in the equipment rack. The procedure requires the following items:

- ❒ #2 Phillips-head screwdriver (not provided)
- ❒ Six equipment rack screws (not provided)
- ❒ #2 Phillips-head, 10 inch-lbs torque screwdriver (optional — not provided)

Caution
Do not remove the shipping brace from the front of the AT-SBx8106 Chassis until after the unit is securely mounted in the rack. The plate prevents twisting of the chassis frame and mechanical misalignment of the line card slots during shipping and installation.

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. ⁂ E30

Warning
To prevent injuring yourself or damaging the device, do not attempt to install the chassis in the equipment rack alone. Allied Telesis recommends a minimum of three people for this procedure.

Before installing the chassis in the rack, review the following checklist:

- ❒ Did you reserve sufficient space in the equipment rack for the chassis and install two screws in the rack on which to rest the chassis while securing it to the rack? If not, then perform “Preparing the Equipment Rack” on page 91.
- ❒ Did you adjust the brackets so that the front of the chassis will be positioned correctly in the equipment rack for your installation? If not, then perform “Adjusting the Equipment Rack Brackets” on page 98.

To install the AT-SBx8106 Chassis in the equipment rack, perform the following procedure:

1. While facing the front of the chassis, tilt the top of the chassis toward you.

2. Lift the AT-SBx8106 Chassis into the equipment rack and set the bottom of the equipment rack brackets firmly on the two equipment rack screws you installed in “Preparing the Equipment Rack” on page 91, as shown in Figure 38.

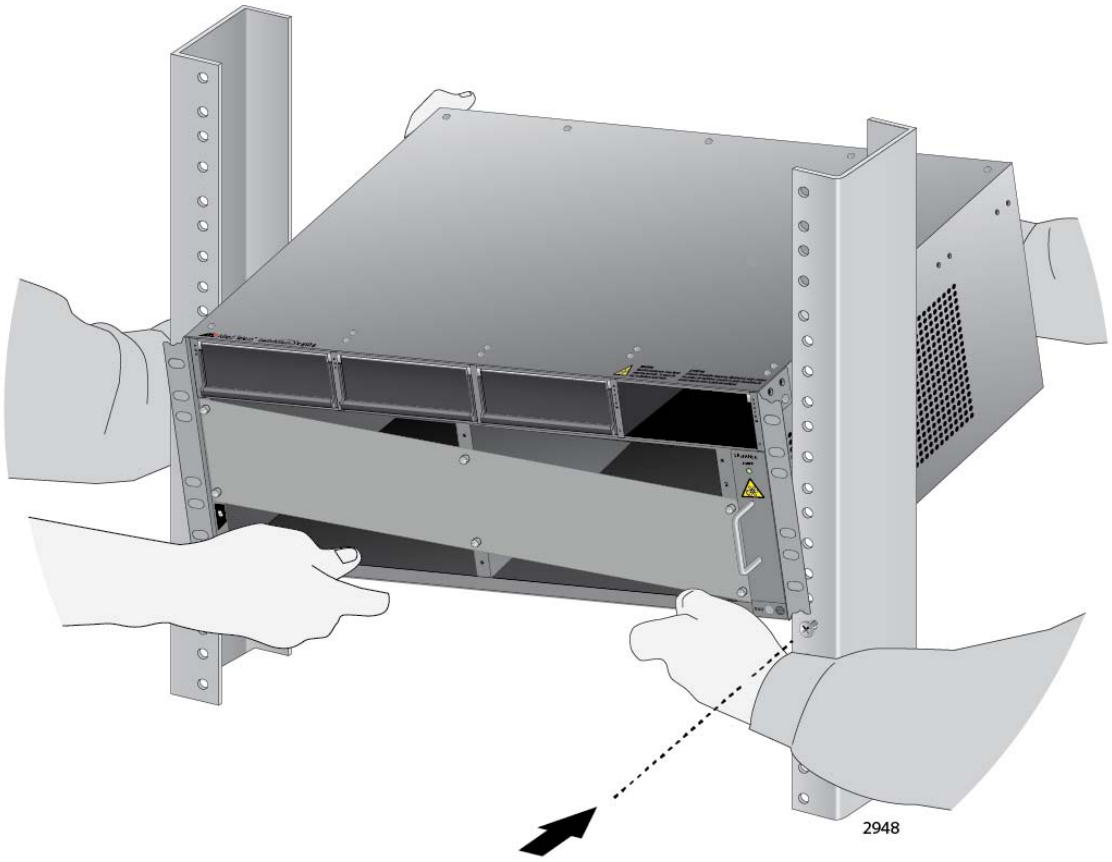


Figure 38. Lifting the AT-SBx8106 Chassis into the Equipment Rack

3. With the bottom of the rack mount ears resting on the two rack mount screws, tilt the top of the chassis back until both rackmount brackets are flush and parallel with the vertical rack rails.

4. Install four rack mount screws (not provided) to secure the chassis to the equipment rack, as shown in Figure 39 on page 102.

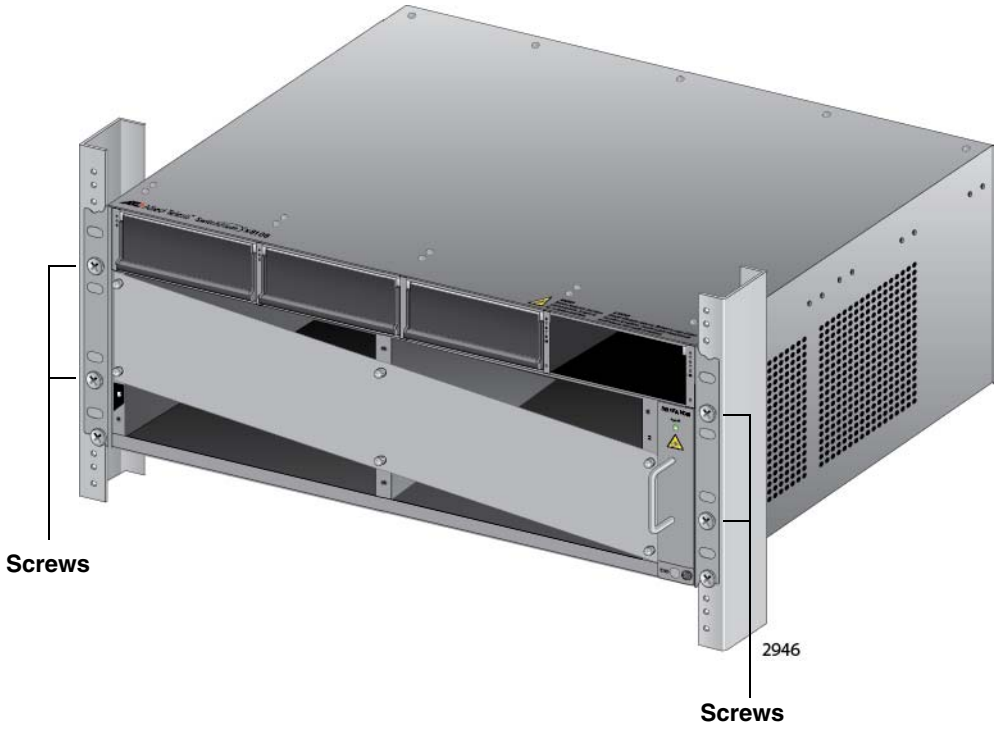


Figure 39. Installing the Rack Mount Screws

5. Tighten all six screws shown in Figure 40 on page 103 to secure the chassis to the equipment rack, Allied Telesis recommends tightening the screws to 10 inch-lbs.

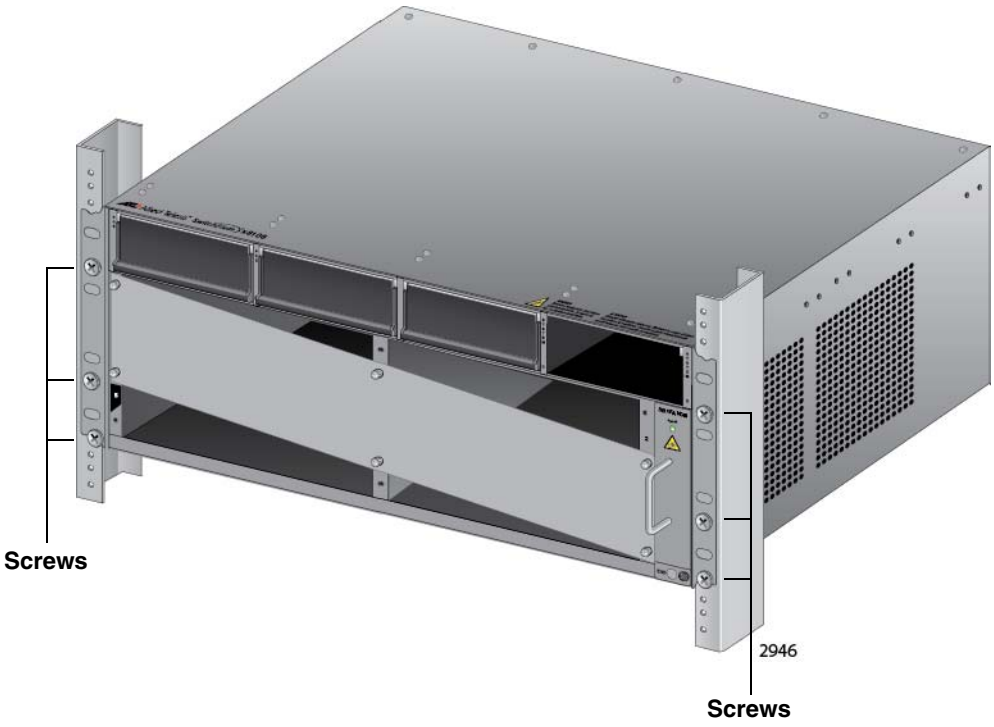


Figure 40. Tightening the Rack Mount Screws

6. Go to “Removing the Shipping Brace” on page 104.

Removing the Shipping Brace

Now that the chassis is installed in the equipment rack, you may remove the shipping brace from the front of the unit. To remove the shipping brace, remove the six mounting screws with a #2 Phillips-head screwdriver (not provided). Refer to Figure 41.

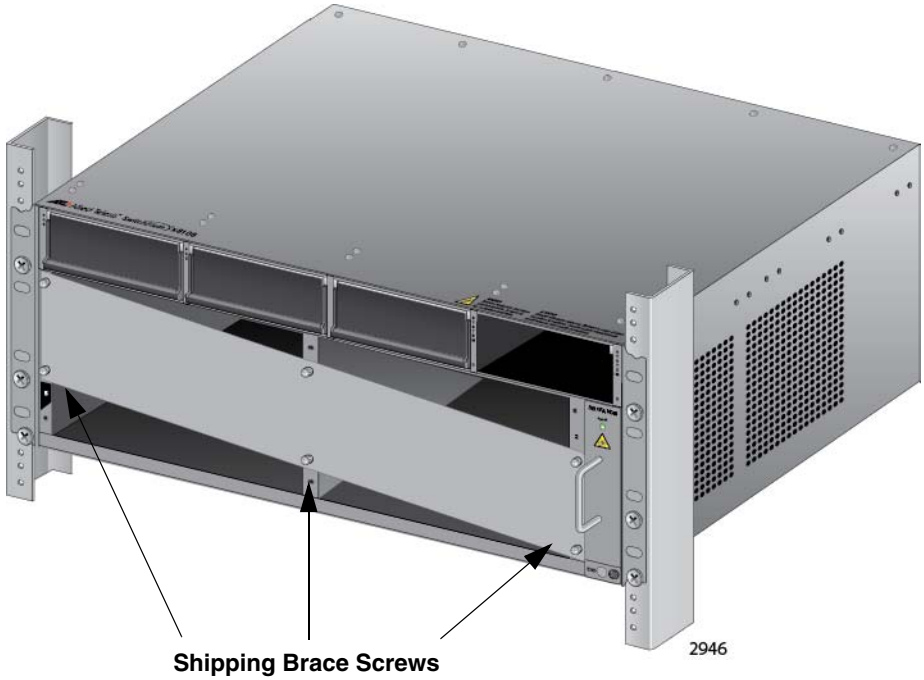


Figure 41. Removing the Shipping Brace

After removing the shipping plate, go to “Installing the Chassis Grounding Wire” on page 105.

Installing the Chassis Grounding Wire

This procedure explains how to connect a grounding wire to the chassis. The chassis requires a permanent connection for the line cards and power supplies to a good earth ground. The procedure requires the following items:

- ❒ Grounding lug (pre-installed on the rear panel of the chassis)
- ❒ #2 Phillips-head screwdriver (not provided)
- ❒ Crimping tool (not provided)
- ❒ 10 AWG stranded grounding wire (not provided)
- ❒ #2 Phillips-head, 20 inch-lbs torque screwdriver (optional — not provided)

To connect the chassis to an earth ground, perform the following procedure:

1. Prepare an adequate length of stranded grounding wire (10 AWG) for the ground connection by stripping it as shown in Figure 42.

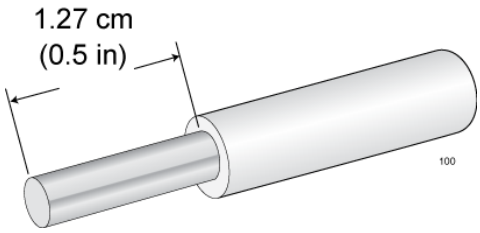


Figure 42. Stripping the Grounding Wire

2. Remove the two screws that secure the grounding lug to the rear panel of the chassis, as shown in Figure 43.

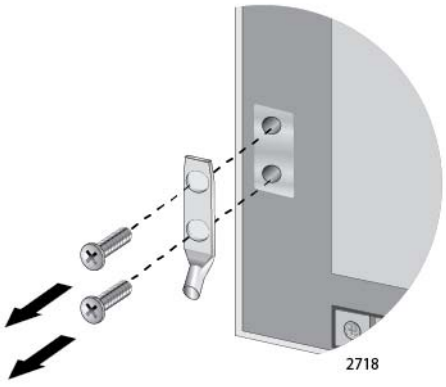


Figure 43. Removing the Grounding Lug

3. Insert one end of the grounding wire into the grounding lug, as shown in Figure 44, and use a crimping tool to secure the wire to the grounding lug.

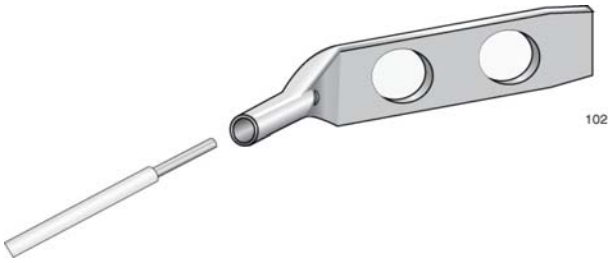


Figure 44. Attaching the Grounding Wire to the Grounding Lug

4. Install the grounding lug on the rear panel of the chassis, as shown in Figure 45.

   Allied Telesis recommends tightening the screws to 20 inch-lbs.

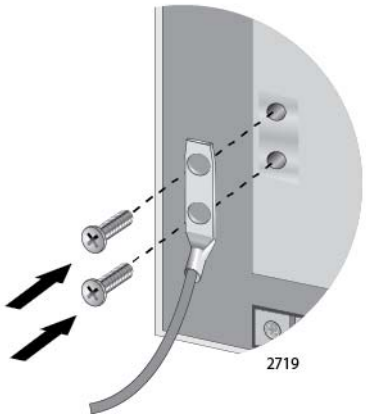


Figure 45. Installing the Grounding Lug and Wire

5. Connect the other end of the grounding wire to the building protective earth.

6. Go to Chapter 6, “Installing the Power Supplies” on page 107.

Chapter 6

Installing the Power Supplies

This chapter explains how to install the power supplies. It has the following sections:

- ❒ “Protecting Against Electrostatic Discharge (ESD)” on page 108
- ❒ “Installing the AT-SBxPWRSYS1 AC System Power Supply” on page 109
- ❒ “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 115
- ❒ “Installing the AT-SBxPWRSYS1 DC System Power Supply” on page 121

Protecting Against Electrostatic Discharge (ESD)

To protect the equipment from damage by Electrostatic Discharge (ESD) during the installation procedure, observe proper ESD protection when handling the SwitchBlade x8106 line cards and power supplies. You should be properly grounded with a wrist or foot strap.

Caution
Electrostatic Discharge (ESD) can damage the components on the SwitchBlade x8106 line cards and power supplies. Be sure to follow proper ESD procedures during the installation.

To guard against ESD, perform this procedure:

1. Verify that the chassis is electrically connected to earth ground.
2. Connect the wrist strap that comes with the chassis to the ESD socket in the bottom right corner of the AT-SBx8106 Chassis, shown in Figure 46. This ensures that ESD voltages safely flow to ground.

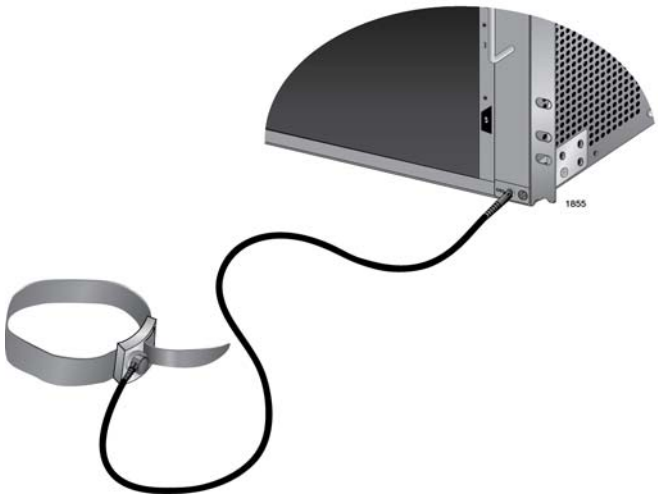


Figure 46. ESD Socket and Wrist Strap

3. When you put on the ESD-preventive wrist strap, be sure it makes good contact with your skin.

Installing the AT-SBxPWRSYS1 AC System Power Supply

For background information on the AT-SBxPWRSYS1 Power Supply, refer to “AT-SBxPWRSYS1 AC Power Supply” on page 28. The chassis must have at least one AT-SBxPWRSYS1 Power Supply.

Warning
The electronic components in the AT-SBxPWRSYS1 Power Supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 108 to guard against ESD damage when unpacking and installing the power supply.

To install the AT-SBxPWRSYS1 Power Supply, perform the following procedure:

1. Choose a slot for the AT-SBxPWRSYS1 Power Supply in the chassis.

   You may install it in either slot C or D, shown in Figure 47. The first AT-SBxPWRSYS1 Power Supply should be installed in slot D, because the slot does not have a blank power supply panel.

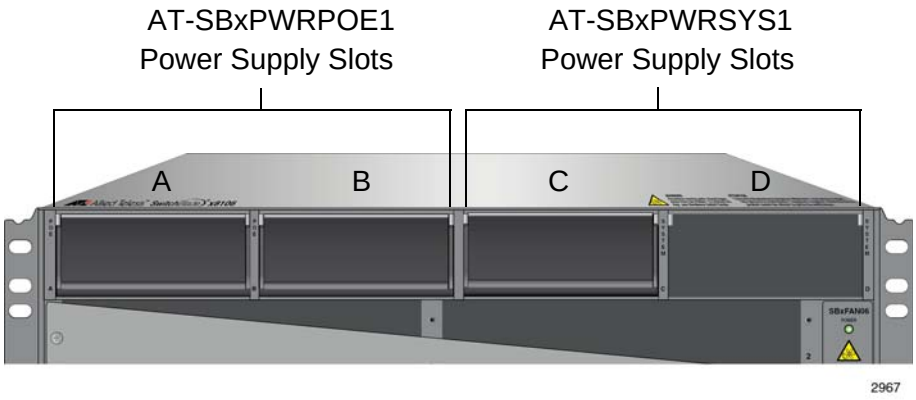


Figure 47. Power Supply Slots

Caution
The AT-SBxPWRSYS1 Power Supply will not work in slot A or B.

2. If the chassis already has a power supply in slot D, remove the blank power supply panel from slot C by lifting the blank panel handle and sliding it out of the slot, as shown in Figure 48 on page 110.

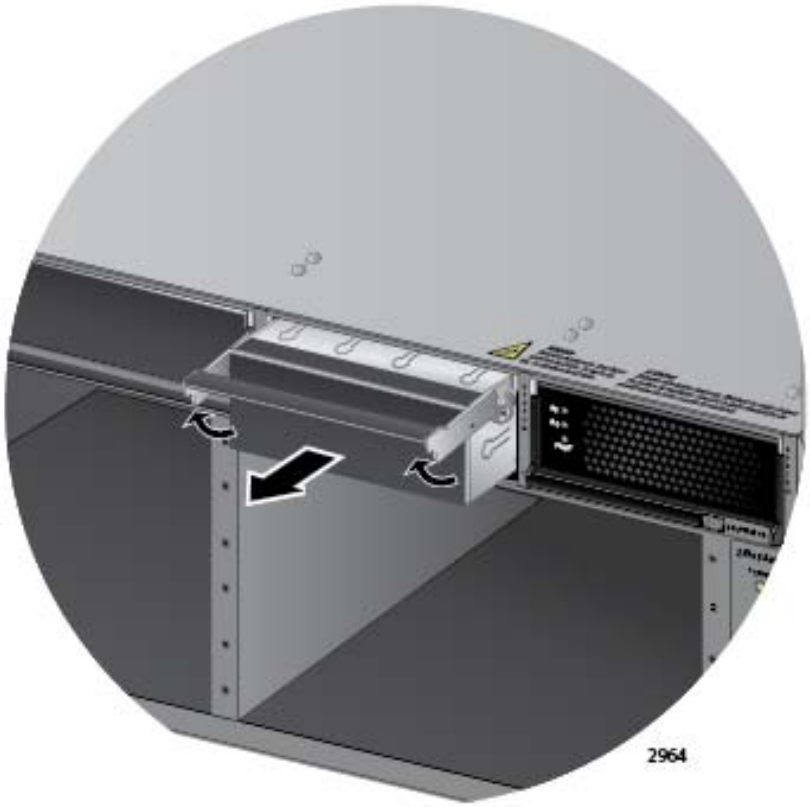


Figure 48. Removing the Blank Slot Cover from Power Supply Slot C

3. Remove the new AT-SBxPWRSYS1 Power Supply from the shipping package and verify the package contents, listed in Figure 49 on page 111.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.

One AT-SBxPWRSYS1 Power Supply Module

One regional AC power cord

One tie wrap

Figure 49. Items Included with the AT-SBxPWRSYS1 Power Supply Module

Note
Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

Note
The tie wrap is used to secure the power cord to the chassis in “Powering On the AT-SBxPWRSYS1 AC System Power Supply” on page 173.

4. Check the power supply for its model name, shown in Figure 50, to verify the module.

   If the module is the AT-SBxPWRPOE1 PoE Power Supply, do not continue with this procedure. Instead, perform “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 115.

Figure 50. Verifying the AT-SBxPWRSYS1 Power Supply

5. Move the locking handle on the AT-SBxPWRSYS1 Power Supply to the unlocked or up position. See Figure 51.

Figure 51. Unlocking the Handle on the AT-SBxPWRSYS1 Power Supply

6. Align and insert the AT-SBxPWRSYS1 Power Supply into the power supply slot. Figure 52 shows the power supply installed in slot D.

Figure 52. Inserting the AT-SBxPWRSYS1 Power Supply

7. Lower the power supply locking handle to secure the power supply to the chassis, as shown in Figure 53.

Figure 53. Lowering the Handle on the AT-SBxPWRSYS1 Power Supply

8. To install a second AT-SBxPWRSYS1 Power Supply, repeat this procedure.

After installing the AT-SBxPWRSYS1 Power Supples, do one of the following:

- If you purchased the AT-SBxPWRPOE1 Power Supply for the ports on the AT-SBx81GP24 PoE Line Cards, go to “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 115.
- Otherwise, go to Chapter 7, “Installing the AT-SBx81CFC960 Controller and Ethernet Line Cards” on page 127.

Note
Retain the tie wrap that comes with the power supply. You will use it to secure the power cord to the chassis when you power on the unit in “Powering On the AT-SBxPWRSYS1 AC System Power Supply” on page 173.

Installing the AT-SBxPWRPOE1 PoE Power Supply

This section contains the installation procedure for the AT-SBxPWRPOE1 Power Supply, for the PoE+ ports on the AT-SBx81GP24 PoE Line Card. For background information, refer to “AT-SBxPWRPOE1 Power Supply” on page 30.

Caution

The electronic components in the AT-SBxPWRPOE1 PoE Power Supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 108 to guard against ESD damage when unpacking and installing the power supply.

To install the power supply, perform the following procedure:

1. Choose a slot for the AT-AT-SBxPWRPOE1 System Power Supply in the chassis.

   You may install it in either slot A or B, shown in Figure 47 on page 109.

2. Raise the handle on the blank panel covering the selected slot and slide the panel from the chassis. Figure 54 on page 116 shows the blank panel being removed from slot A.

Figure 54. Removing the Blank Slot Cover from Power Supply Slot A

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 55 on page 117.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.

One AT-SBxPWRPOE1 Power Supply Module

One regional AC power cord

One tie wrap

Figure 55. Items Included with the AT-SBxPWRPOE1 Power Supply Module

Note
Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

Note
The tie wrap is used to secure the power cord to the chassis in “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176.

4. Check the model name, shown in Figure 56, to verify the module.

   If the module is the AT-SBxPWRSYS1 System Power Supply, do not continue with this procedure. Instead, perform “Installing the AT-SBxPWRSYS1 AC System Power Supply” on page 109.

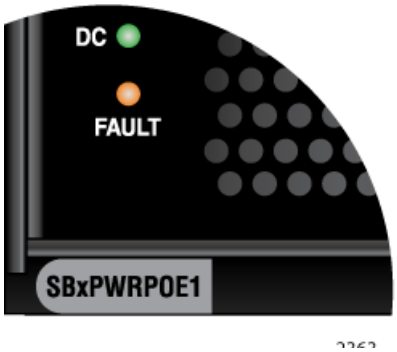


Figure 56. Verifying the AT-SBxPWRPOE1 PoE Power Supply

5. Raise the locking handle on the AT-SBxPWRPOE1 Power Supply, as shown Figure 57.

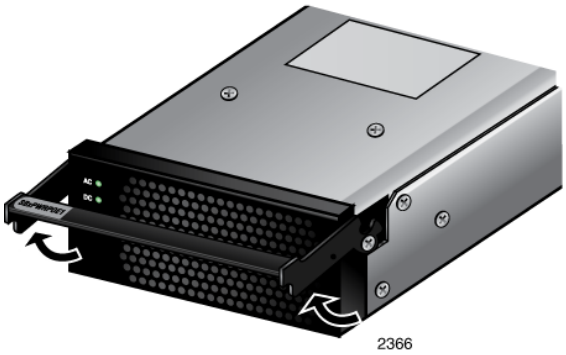


Figure 57. Unlocking the Handle on the AT-SBxPWRPOE1 Power Supply

6. Align and insert the AT-SBxPWRPOE1 Module into slot A or B. Figure 58 on page 119 shows the power supply module aligned in slot A.

Caution
The AT-SBxPWRPOE1 AC Power Supply will not work in slot C or D.

Figure 58. Inserting the AT-SBxPWRPOE1 Power Supply

7. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 59.

Figure 59. Locking the Handle on the AT-SBxPWRPOE1 Power Supply

8. To install a second AT-SBxPWRPOE1 Power Supply, repeat this procedure.

9. After installing the AT-SBxPWRPOE1 Power Supplies, go to Chapter 7, “Installing the AT-SBx81CFC960 Controller and Ethernet Line Cards” on page 127.

Note
Retain the tie wrap that comes with the power supply. You use it to secure the power cord to the chassis when you power on the unit in “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176.

Installing the AT-SBxPWRSYS1 DC System Power Supply

This section contains the installation procedure for the AT-SBxPWRSYS1 DC Power Supply. For background information, refer to “AT-SBxPWRSYS1 DC Power Supply” on page 32.

Caution
The electronic components in the AT-SBxPWRSYS1 DC Power Supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 108 to guard against ESD damage when unpacking and installing the power supply.

To install the power supply, perform the following procedure:

1. Choose a slot in the chassis for the AT-AT-SBxPWRSYS1 DC System Power Supply.

   You may install it in slot C or D, shown in Figure 47 on page 109. The first AT-SBxPWRSYS1 Power Supply should be installed in slot D, because the slot does not have a blank power supply panel.

Caution
The AT-SBxPWRSYS1 DC System Power Supply will not work in slot A or B.

2. If the chassis already has a power supply in slot D, remove the blank power supply panel from slot C by lifting the blank panel handle and sliding it out of the slot, as shown in Figure 60 on page 122.

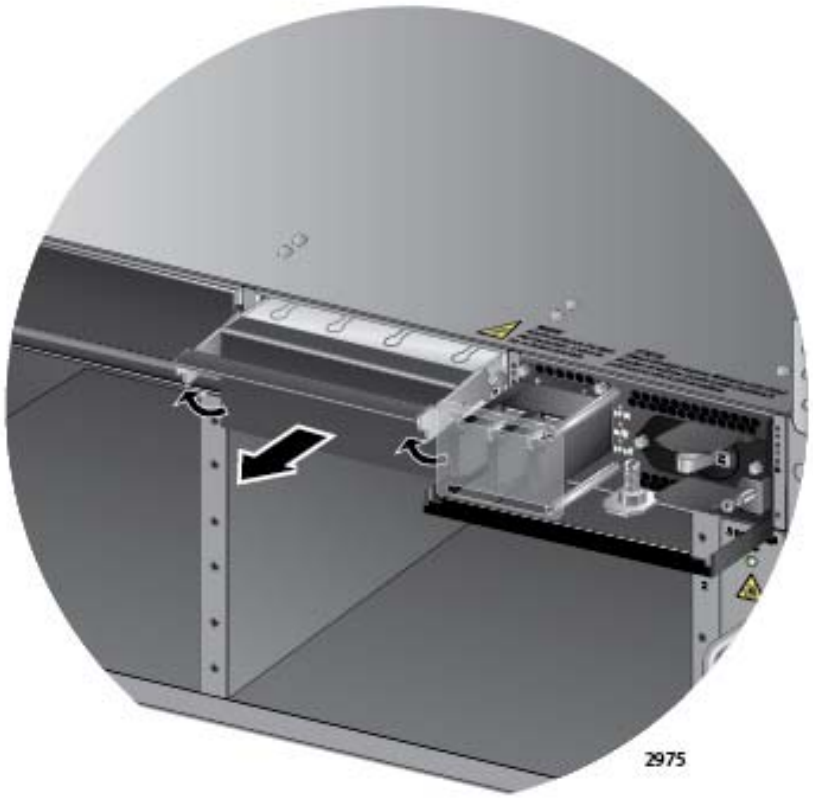
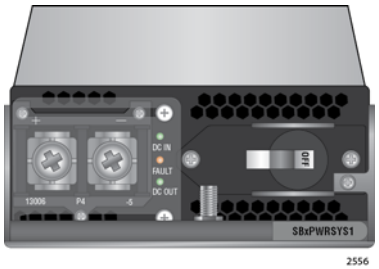


Figure 60. Removing the Blank Slot Cover from Power Supply Slot C

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 61 on page 123.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBxPWRSYS1 DC Power Supply Module

Two straight power wire ring lugs

One grounding wire ring lug

Two right angle power wire ring lugs

Figure 61. Items Included with the AT-SBxPWRSYS1 DC Power Supply Module

Note
Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

4. Verify that the On/Off switch on the power supply is in the Off position. Refer to Figure 62 on page 124.

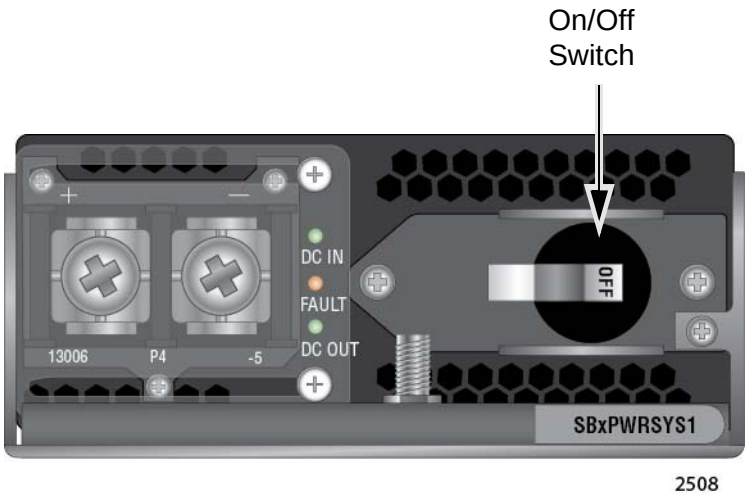


Figure 62. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

5. With a #2 Phillips-head screwdriver, loosen the handle locking screw on the power supply, as shown in Figure 63.

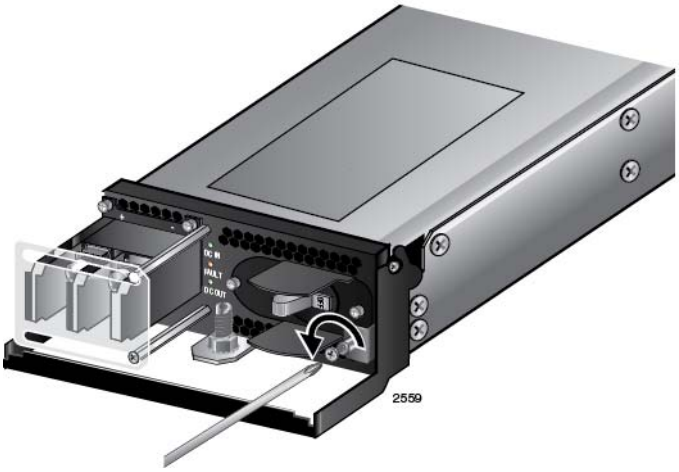


Figure 63. Loosening the Handle Locking Screw on the AT-SBxPWRSYS1 DC Power Supply

6. Raise the locking handle on the AT-SBxPWRSYS1 DC Power Supply, as shown Figure 64 on page 125.

Figure 64. Raising Handle on the AT-SBxPWRSYS1 DC Power Supply

7. Align and insert the AT-SBxPWRSYS1 Module into slot C or D. Figure 65 shows the power supply installed in slot D.

Caution
The AT-SBxPWRSYS1 DC System Power Supply will not work in slot A or B.

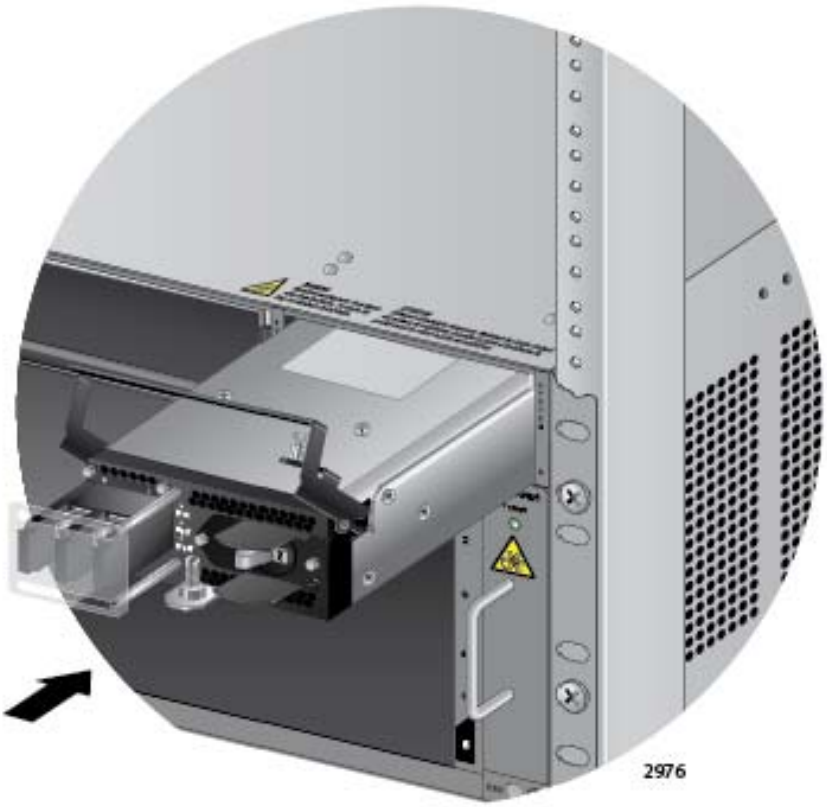


Figure 65. Inserting the AT-SBxPWRSYS1 DC System Power Supply

8. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 66.

Figure 66. Locking the Handle on the AT-SBxPWRSYS1 DC System Power Supply

Note
Do not tighten the handle locking screw yet. You may need to slightly lift the handle to move the plastic guard panel when you connect the positive and negative wires in “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 179.

9. To install a second AT-SBxPWRSYS1 DC System Power Supply, repeat this procedure.

10. After installing the power supplies, go to Chapter 7, “Installing the AT-SBx81CFC960 Controller and Ethernet Line Cards” on page 127.

Note
Retain the five wire ring lugs that come with the power supply. You use them to wire the power supply in “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 179

Chapter 7

Installing the AT-SBx81CFC960 Controller and Ethernet Line Cards

This chapter describes how to install the controller and Ethernet line cards. The chapter has the following sections:

- “Guidelines to Handling the Controller and Line Cards” on page 128
- “Installing the AT-SBx81CFC960 Controller Fabric Card” on page 130
- “Installing the Ethernet Line Cards” on page 136
- “Installing the Blank Slot Covers” on page 140

Guidelines to Handling the Controller and Line Cards

Please observe the following guidelines when handling the controller and Ethernet line cards:

- ❒ The cards are hot swappable and can be installed or removed while the chassis is powered on.
- ❒ Always wear an anti-static device when handling the cards.

Caution
The electronic components on the controller and line cards can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 108 to guard against ESD damage when unpacking and installing the line cards.

- ❒ Hold a card by its faceplate and edges.
- ❒ Never touch the electronic components on the top or bottom of a card.
- ❒ To avoid damaging the components on the bottom of a card, do not set it down on a table or desk. If you need to set down a card, return it to its anti-static bag and packaging container.
- ❒ Do not remove a card from its anti-static bag until you are ready to install it in the chassis.
- ❒ If you need to remove a card from the chassis, immediately return it in its anti-static bag and packaging container.
- ❒ Never hold or lift a controller card by the handles on the front faceplate. You might bend or damage the handles.

Caution
You must keep a controller or Ethernet line card level as you slide it into or out of the chassis. You might damage the components on the top or bottom of a card if you slide it at an angle. Refer to Figure 67 on page 129.

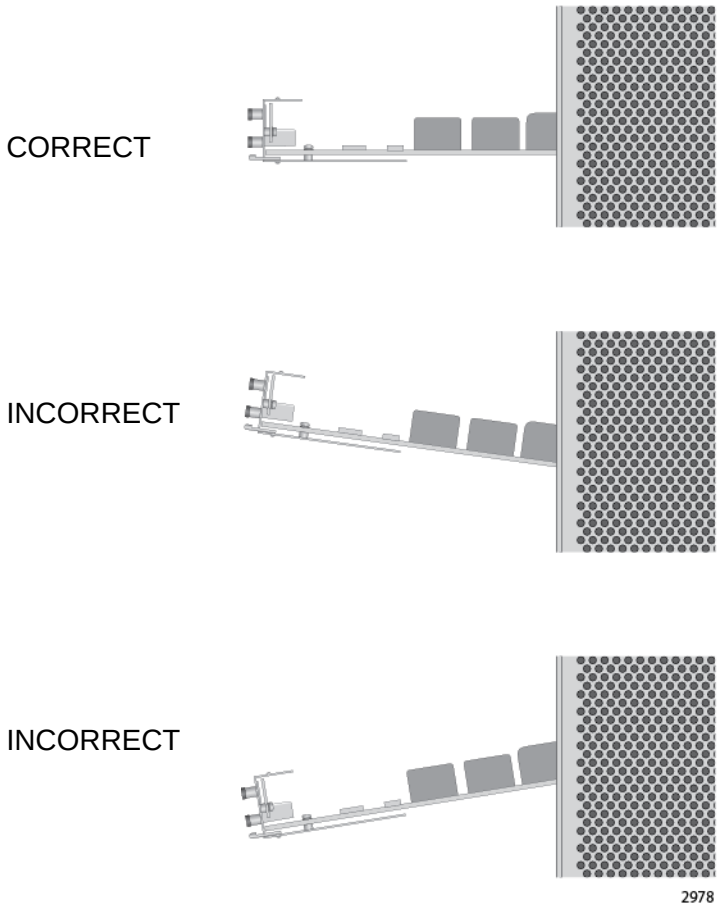


Figure 67. Aligning a Card in a Slot

Installing the AT-SBx81CFC960 Controller Fabric Card

This section contains the installation procedure for the AT-SBx81CFC960 Controller Fabric Card. You may install either one or two controller cards in the unit. The chassis must have at least one controller card. The cards must be installed in slots 5 and 6 in the chassis.

Note
Please review “Guidelines to Handling the Controller and Line Cards” on page 128 before performing this procedure:

This procedure requires the following tools:

- #2 Phillips-head screwdriver (not provided)
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided))

To install the AT-SBx81CFC960 Card, perform the following procedure:

1. Choose a slot in the chassis for the AT-SBx81CFC960 Controller Fabric Card.

   Slots 5 and 6, shown in Figure 68, are for controller cards. Slot 5 is dedicated for use with the controller card while slot 6 can be used with either a controller card or an Ethernet line card. If you are installing only one controller card, Allied Telesis recommends installing it in slot 5.

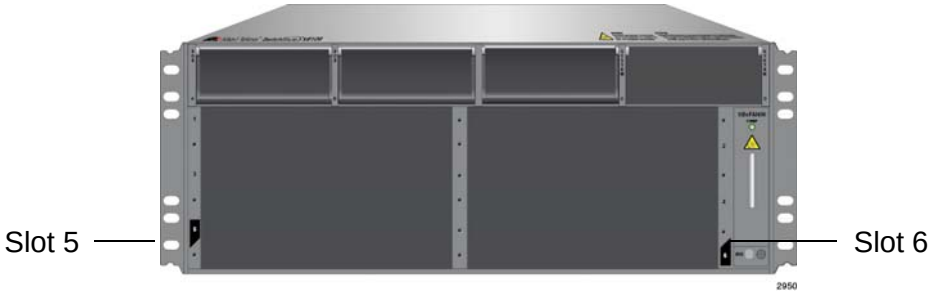
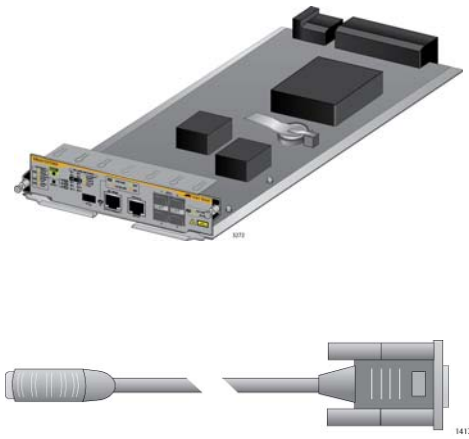


Figure 68. Slots 5 and 6 for the AT-SBx81CFC960 Card

2. Remove the new AT-SBx81CFC960 Controller Fabric Card from the shipping package and verify the package contents, listed in Table 69 on page 131.

   If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBx81CFC960 Controller Fabric Card

One 2 m (6.6 ft) local management cable with RJ-45 (8P8C) and DB-9 (D-sub 9-pin) connectors.

Figure 69. Items Included with the AT-SBx81CFC960 Controller Fabric Card

Note
Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

3. Carefully remove the controller card from the anti-static bag. Refer to Figure 70.

Figure 70. Removing the AT-SBx81CFC960 Controller Fabric Card from the Anti-static Bag

4. Carefully remove the battery insulator tab on the controller card by sliding it out from between the battery and battery clip, as shown in Figure 71 on page 132.

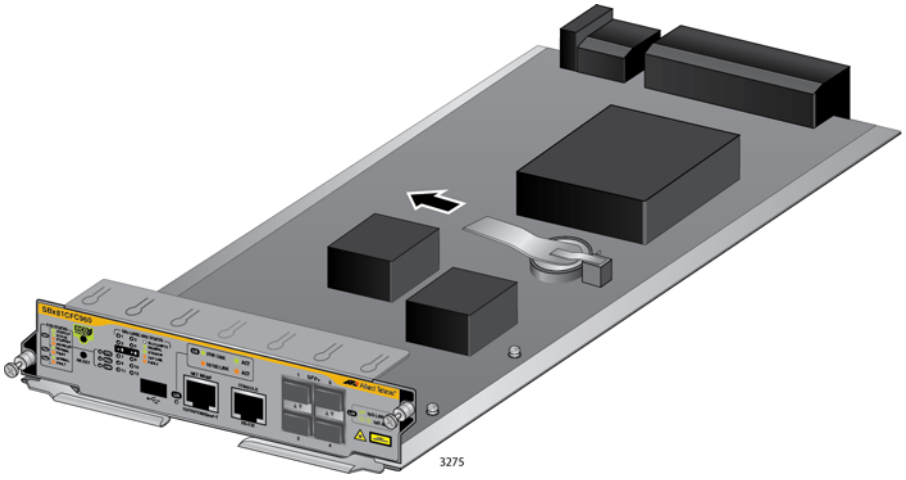


Figure 71. Removing the Battery Insulator

5. Move the locking handles on the front panel to the open position, as shown in Figure 72.

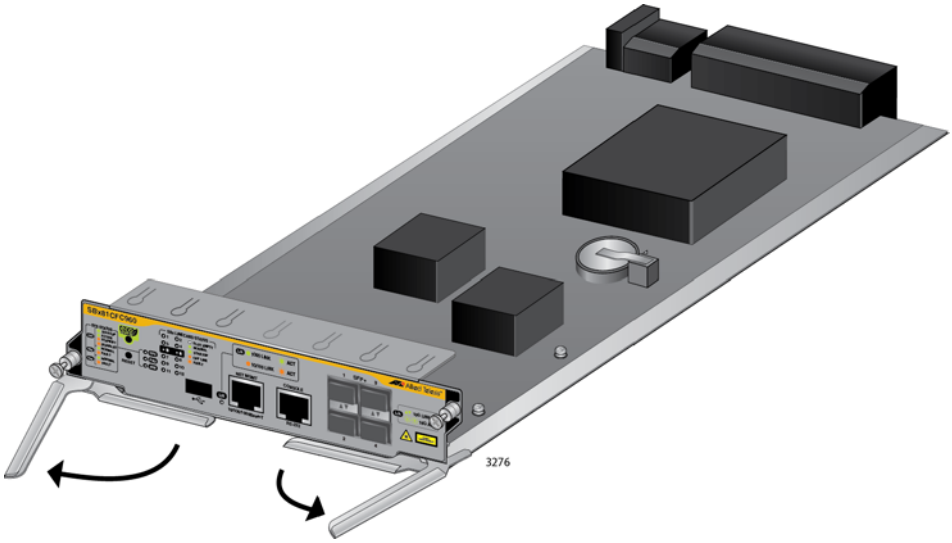


Figure 72. Opening the Locking Handles on the AT-SBx81CFC960 Controller Fabric Card

6. Align the edges of the AT-SBx81CFC960 Controller Fabric Card with the internal chassis card guides in slot 5 or 6 of the AT-SBx8106 Chassis. Figure 73 on page 133 shows the AT-SBx81CFC960 Card aligned in slot 5.

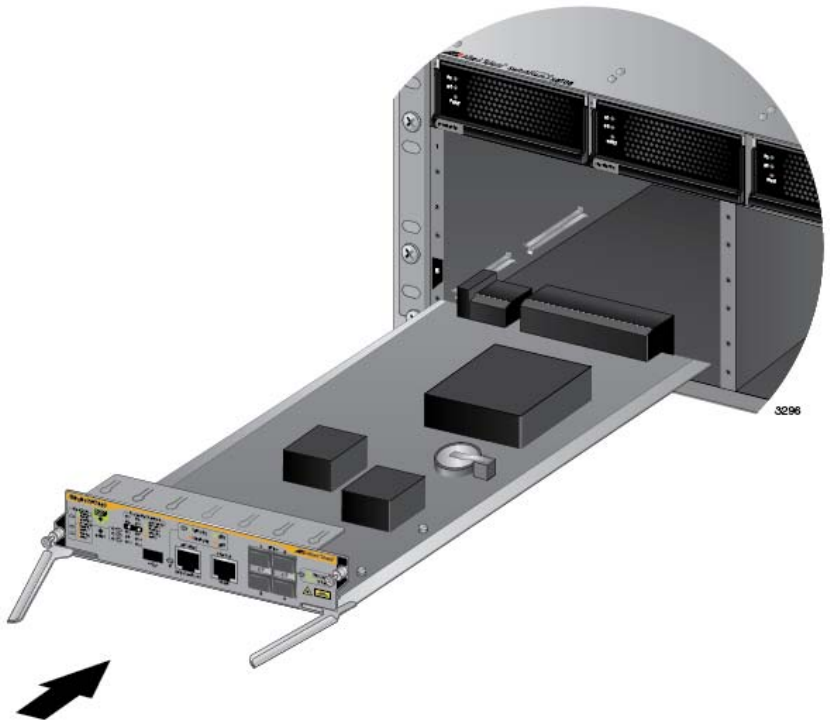


Figure 73. Aligning the AT-SBx81CFC960 Card in the Chassis Slot

7. Slowly and carefully slide the card into the slot.

Caution
Keep the card level with the chassis as you slide it into the slot. You might damage the components on the top or bottom of the card if you slide it in at an angle. Refer to Figure 67 on page 129.

Caution
Do not force the AT-SBx81CFC960 Card into the slot. If you feel resistance, remove it and try again. Be sure that the edges of the card are properly aligned with the card guides.

8. When you feel the card make contact with the connector on the backplane of the chassis, carefully close the two locking levers on the front panel of the controller card to secure it in the chassis, as shown in Figure 74 on page 134.

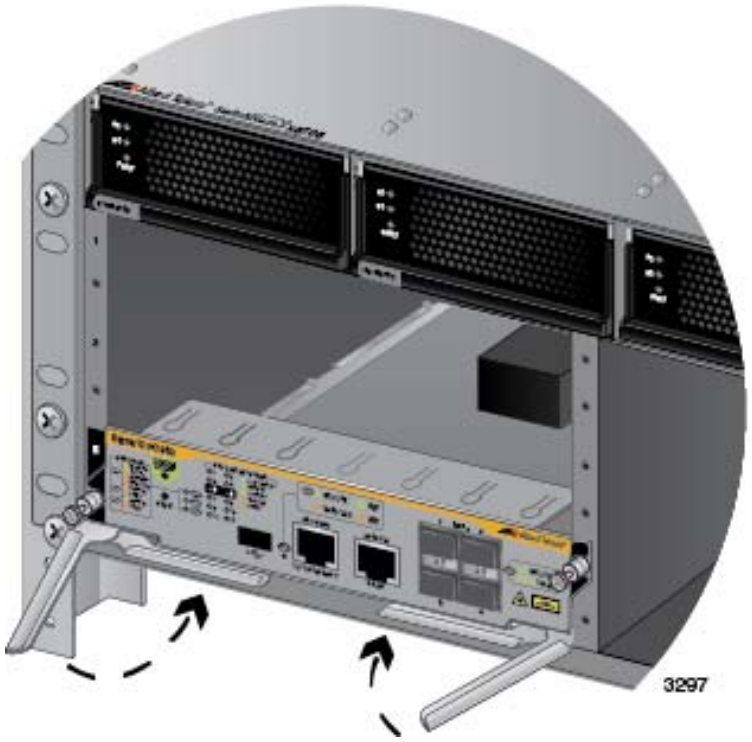


Figure 74. Closing the Locking Levers on the AT-SBx81CFC960 Controller Fabric Card

9. Finger tighten the two thumbscrews on the card to secure the card to the chassis, as shown in Figure 75 on page 135.

Figure 75. Tightening the Thumb Screws on the AT-SBx81CFC960 Card

10. Tighten the screws with a #2 Phillips-head screwdriver to secure the controller card to the chassis.

    Allied Telesis recommends tightening the screws to 5 inch-lbs.

11. if the chassis is to have two AT-SBx81CFC960 Controller Fabric Cards, repeat this procedure to install the second card.

12. Go to “Installing the Ethernet Line Cards” on page 136.

Installing the Ethernet Line Cards

This section contains the installation procedure for the Ethernet line cards. The illustrations show the AT-SBx81GP24 Line Card. The procedure is the same for all the cards.

Note
Please review “Guidelines to Handling the Controller and Line Cards” on page 128 before performing this procedure.

This procedure requires the following tools:

- #2 Phillips-head screwdriver (not provided)
- #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided)

To install the Ethernet line cards, perform the following procedure:

1. Choose a slot in the chassis for the Ethernet line card.

   You may install Ethernet line cards in slots 1 to 4. You may also use slot 6 if the chassis has only one controller card. (Slot 5 is reserved for the controller card.) The slots are shown in Figure 76.

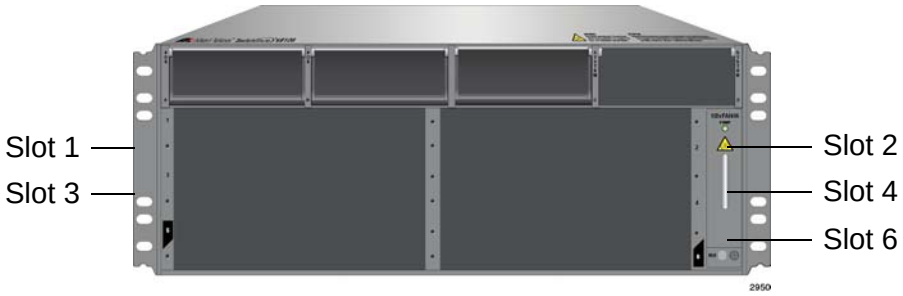


Figure 76. Slots 1 to 4 for the Ethernet Line Cards

2. Remove the line card from the shipping package. If it is missing or damaged, contact your Allied Telesis sales representative for assistance.

Note
Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

3. Carefully remove the Ethernet line card from the anti-static bag. Refer to Figure 77.

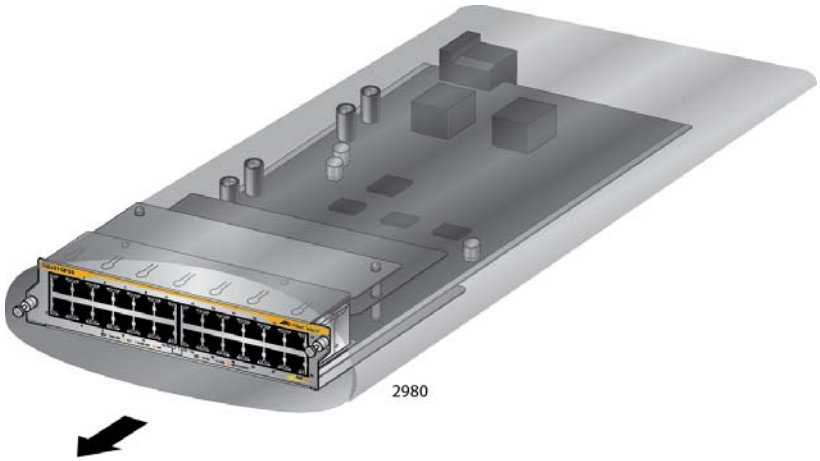


Figure 77. Removing an Ethernet Line Card from the Anti-static Bag

4. Align the line card with the internal chassis card guides in the selected slot in the chassis.

   Figure 78 shows an Ethernet line card aligned with slot 1.

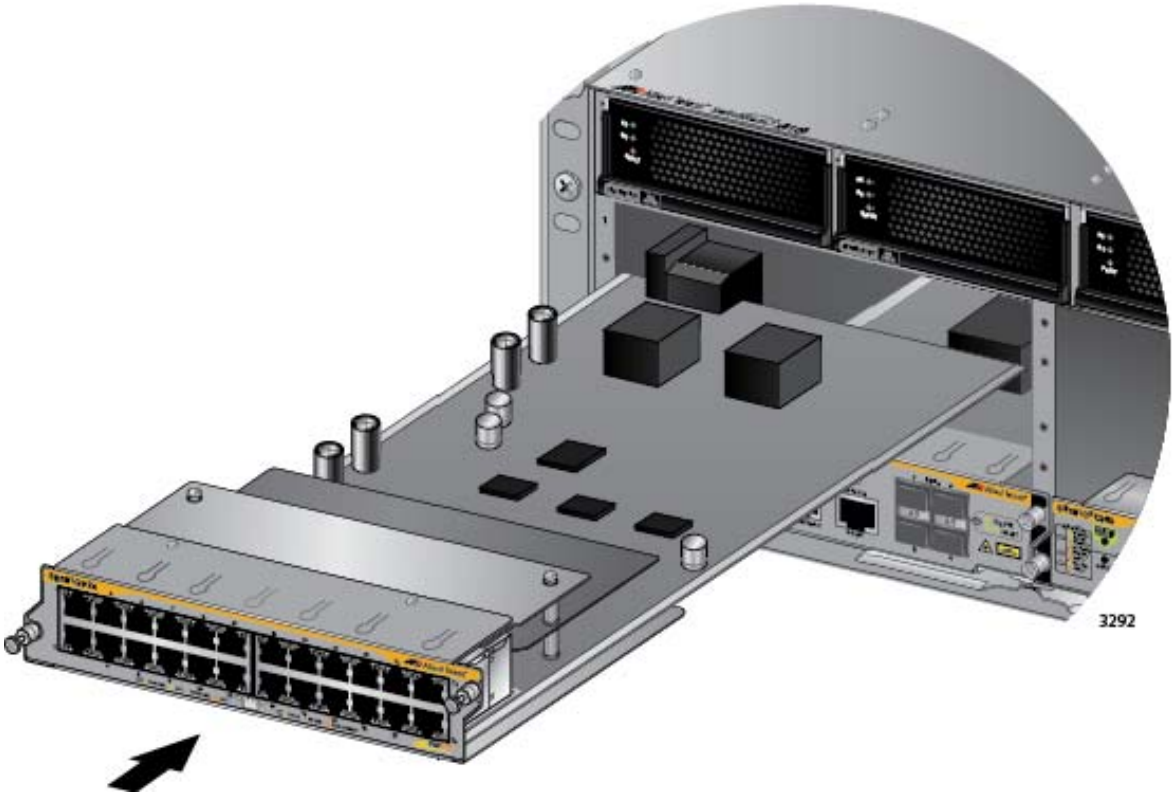


Figure 78. Aligning an Ethernet Line Card in a Chassis Slot

5. Slowly and carefully slide the card into the slot.

Caution
Keep the card level with the chassis as you slide it into the slot. You might damage the components on the top or bottom of the card if you slide it in at an angle. Refer to Figure 67 on page 129.

Caution
Do not force the card into the slot. If you feel resistance, remove the card and try again. Be sure that the edges of the card are properly aligned with the card guides.

6. When you feel the line card make contact with the connector on the backplane of the chassis, gently press on both sides of the faceplate to seat the card on the connector. Refer to Figure 79.

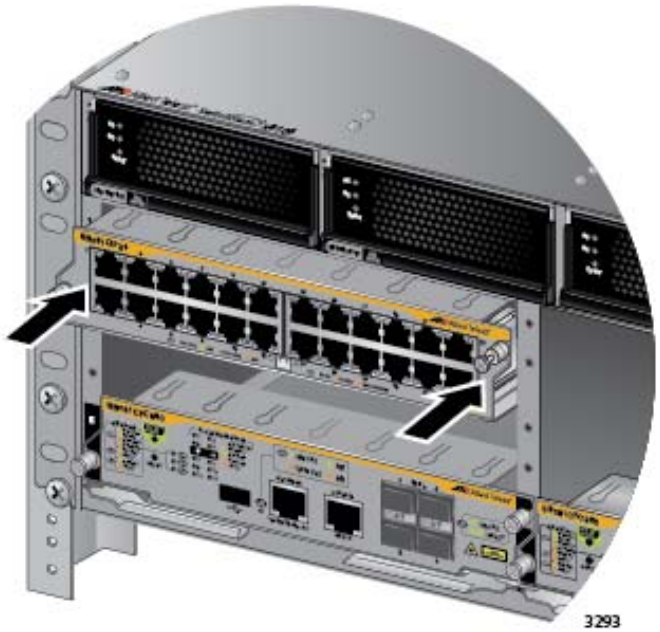


Figure 79. Seating an Ethernet Line Card on the Backplane Connector

7. Finger tighten the two thumbscrews on each side of the line card to secure it to the chassis, as shown in Figure 80 on page 139.

Figure 80. Tightening the Thumb Screws on an Ethernet Line Card

8. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the line card to the chassis.

   Allied Telesis recommends tightening the screws to 5 inch-lbs.

9. Repeat this procedure to install the remaining Ethernet line cards.

10. After installing the line cards. go to “Installing the Blank Slot Covers” on page 140.

Installing the Blank Slot Covers

After installing the AT-SBx81CFC960 Controller Fabric Cards and Ethernet line cards, check the front panel for unused slots and cover them with the blank slot covers included with the chassis, as explained in this procedure. The fan module may not be able to maintain adequate airflow across the controller and line cards if the chassis is not completely enclosed. If there are no unused slots, go to Chapter 8, “Installing the Transceivers and Cabling the Ports” on page 143.

To install the blank panels on the unused slots, perform the following procedure:

1. Position a blank slot cover over an unused slot, as shown in Figure 81. The up arrow on the panel must be pointing up.

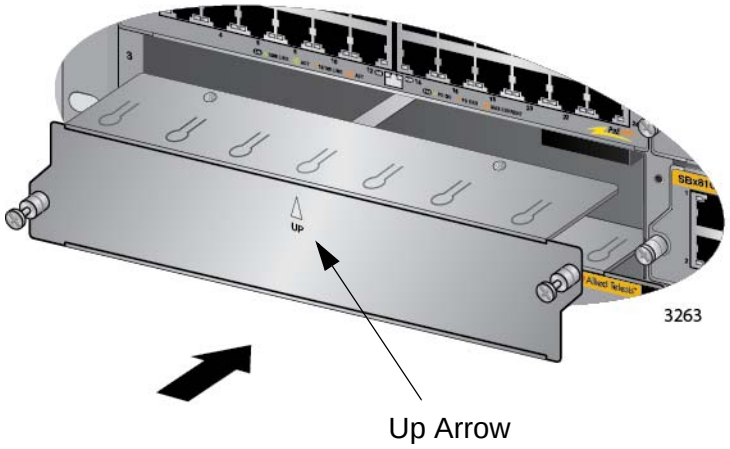


Figure 81. Installing a Blank Slot Cover

2. Finger tighten the two thumbscrews to attach the blank panel to the chassis, as shown in Figure 82.

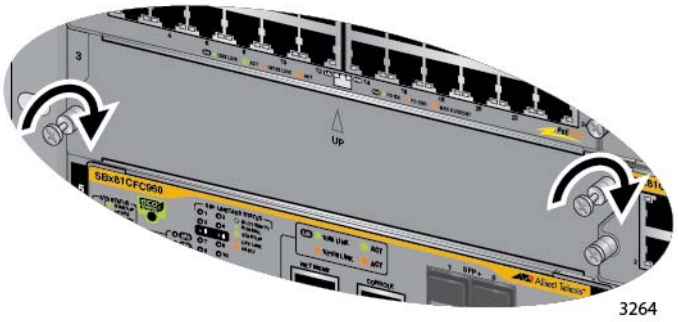


Figure 82. Tightening the Thumbscrews on a Blank Slot Cover

3. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the blank slot cover to the chassis.

Allied Telesis recommends tightening the screws to 5 inch-lbs.

4. Repeat this procedure to cover the remaining empty slots with blank slot covers.
5. Store any unused blank panels in a secure location for future use.
6. Go to Chapter 8, “Installing the Transceivers and Cabling the Ports” on page 143.

Chapter 8

Installing the Transceivers and Cabling the Ports

This chapter describes how to install the fiber optic transceivers and attach the cables to the ports on the line cards. The chapter has the following sections:

- ❒ “Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GT24, AT-SBx81GP24, and AT-SBx81GT40 Line Cards” on page 144
- ❒ “Guidelines to Installing SFP and SFP+ Transceivers” on page 147
- ❒ “Installing SFP Transceivers in the AT-SBx81GS24a Line Card” on page 148
- ❒ “Installing SFP+ Transceivers in the AT-SBx81XS6 Line Card” on page 152
- ❒ “Installing AT-SP10TW Cables in the AT-SBx81XS6 Line Card” on page 156
- ❒ “Installing SFP+ Transceivers in the AT-SBx81XS16 Line Card” on page 159
- ❒ “Installing AT-SP10TW Cables in the AT-SBx81XS16 Line Card” on page 163
- ❒ “Cabling the NET MGMT Port on the AT-SBx81CFC960 Card” on page 165
- ❒ “Installing SFP+ Transceivers in the AT-SBx81CFC960 Card” on page 167

Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GT24, AT-SBx81GP24, and AT-SBx81GT40 Line Cards

Here are the guidelines to cabling the 10/100/1000Base-T twisted pair ports on the AT-SBx81GT24, AT-SBx81GP24, and AT-SBx81GT40 Line Cards:

- The 10/100/1000Base-T twisted pair ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards have 8-pin RJ45 connectors.
- The 10/100/1000Base-T twisted pair ports on the AT-SBx81GT40 Line Card have 8-pin RJ point 5 connectors.
- The cable specifications for the 10/100/1000Base-T twisted pair ports on the AT-SBx81GT24 and AT-SBx81GT40 Line Cards are listed in Table 12 on page 54.
- The cable specifications for the 10/100/1000Base-T twisted pair ports on the AT-SBx81GP24 Line Card are listed in Table 13 on page 54.
- The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- The default setting for PoE on the ports on the AT-SBx81GP24 Line Card is enabled.
- The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have fixed speeds or 10 or 100 Mbps. For those switch ports, disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- The 10/100/1000Base-T ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. Disable Auto-Negotiation on those ports and set their duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

- The default wiring configuration of the ports is automatic MDIX detection, which configures the MDI/MDIX setting automatically. This setting is appropriate for switch ports that are connected to network devices that also support the feature.
- The default wiring configuration of automatic MDIX detection is not appropriate for ports that are connected to network devices that do not support the feature. On those ports, you should disable automatic MDIX detection and set the wiring configuration manually with the POLARITY command.

Connecting Cables to the AT-SBx81GT40 Line Card

Here are a few additional guidelines to connecting cables to ports on the AT-SBx81GT40 Line Card:

- The ports require the RJ point 5 cable connector shown in Figure 83.

Figure 83. RJ Point 5 Cable Connector for AT-SBx81GT40 Line Card

- To connect a cable to a port in the top role on the line card, orient the connector with the release tab on top. To connect a cable to a port in the bottom role, orient the connector with the release tab on the bottom. Refer to Figure 84 on page 146.
- To remove a cable from a port, pull gently on the release tab and slide the cable connector from the port.

Note
Patch cables for the AT-SBx81GT40 Line Card, in lengths of 1 meter and 3 meters with RJ point 5 and RJ-45 connectors, are available from Allied Telesis. Contact your Allied Telesis sales representative for information.

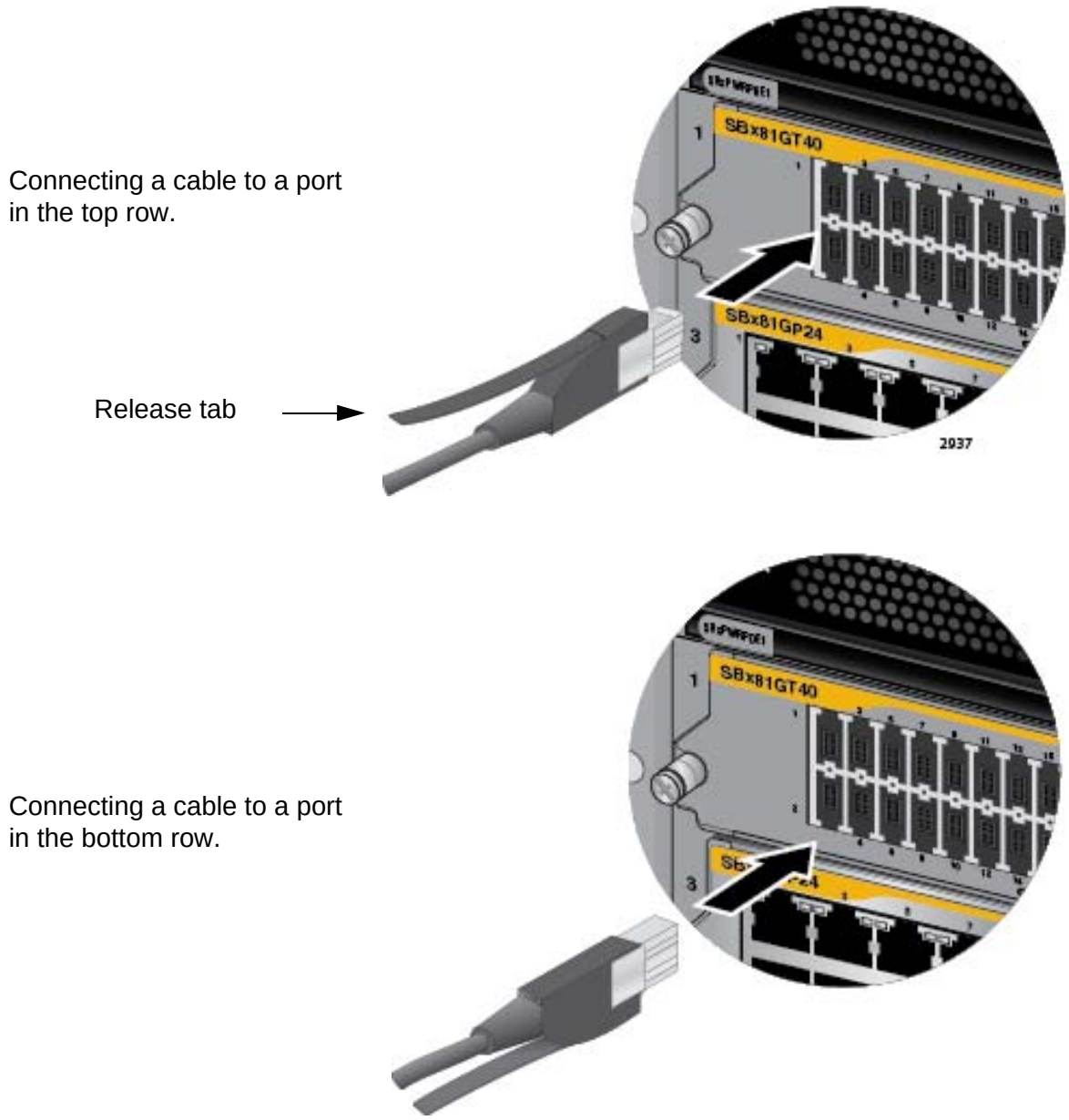


Figure 84. Connecting Cables to Ports on the AT-SBx81GT40 Line Card

Guidelines to Installing SFP and SFP+ Transceivers

Please review the following guidelines before installing fiber optic transceivers in the AT-SBx81GS24a and AT-SBx81XS6 Line Cards:

- You should install a transceiver in a line card before connecting its network cable.
- A fiber optic transceiver is dust sensitive. Always keep the protective cover in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove this cover, retain it for future use.
- Your Allied Telesis sales representative can provide you with a list of supported transceivers for the line cards.
- The operational specifications and fiber optic cable requirements of the transceivers are provided in the documents included with the devices.
- The SFP and SFP+ transceivers and AT-SP10TW cables are hot-swappable. You may install them while the chassis is powered on.
- Unnecessary removal or insertion of transceivers can lead to premature failures.

Warning
Transceivers can be damaged by static electricity. Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 108 to guard against ESD damage when unpacking and installing the devices.

Caution
The temperature of an operational transceiver may exceed 70 C (158 F). Exercise caution when removing or handling a transceiver with unprotected hands.

Installing SFP Transceivers in the AT-SBx81GS24a Line Card

Please review the information in “Guidelines to Installing SFP and SFP+ Transceivers” on page 147 before performing this procedure.

To install SFP transceivers in AT-SBx81GS24a Line Cards, perform the following procedure:

1. Remove the transceiver from its shipping container and store the packaging material in a safe location.

2. Remove the dust cover from the SFP slot chosen for the transceiver, as shown in Figure 85.

Figure 85. Removing the Dust Cover from an SFP Slot in the AT-SBx81GS24a Line Card

3. To install the transceiver in an SFP slot on the top row of the line card, orient the transceiver with the handle on top, as shown in Figure 86. To install it into a slot on the bottom row of the line card, orient it with the handle on the bottom.

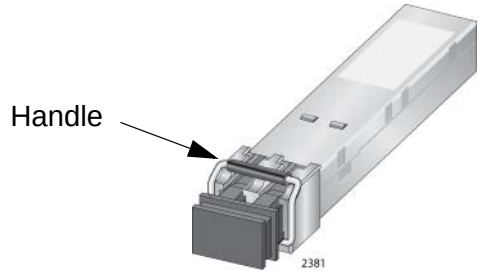


Figure 86. Handle on SFP Transceiver

4. Slide the transceiver into the slot until it clicks into place, as shown in Figure 87.

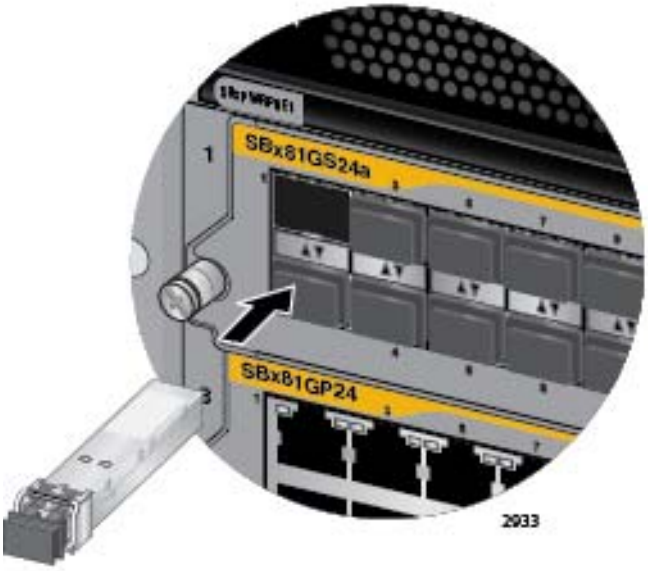


Figure 87. Inserting the SFP Transceiver in the AT-SBx81GS24a Line Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 4 to install the remaining SFP transceivers in the line cards.

5. Remove the protective cover from the SFP transceiver, as shown in Figure 88 on page 150.

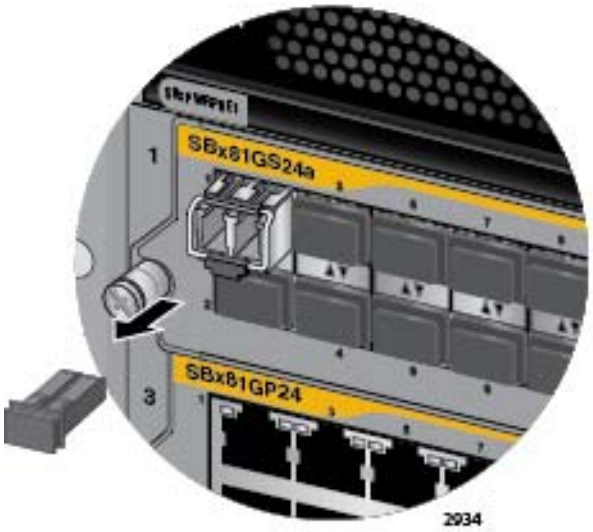


Figure 88. Removing the Dust Cover from the SFP Transceiver in the AT-SBx81GS24a Line Card

Note
The dust cover protects the fiber optic port on the SFP transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

6. Before connecting the cable, verify the position of the handle on the SFP transceiver. The handle should be in the up position if the transceiver is in the top row on the line card, as shown in Figure 89, or the down position if the transceiver is in the bottom row.

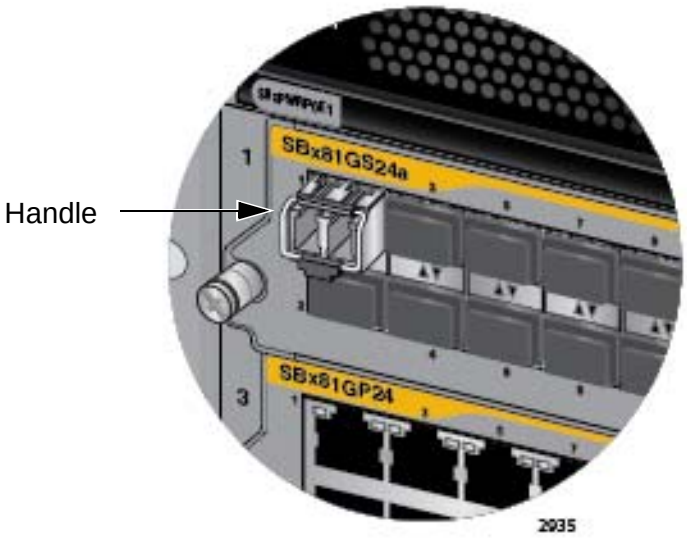


Figure 89. Verifying the Position of the Handle on the SFP Transceiver in the AT-SBx81GS24a Line Card

7. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 90. The connector should snap into the port.

Figure 90. Attaching a Fiber Optic Cable to an SFP Transceiver in the AT-SBx81GS24a Line Card

8. Repeat this procedure to install additional SFP transceivers.

After installing and cabling the SFP transceivers, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Installing SFP+ Transceivers in the AT-SBx81XS6 Line Card

Please review the information in “Guidelines to Installing SFP and SFP+ Transceivers” on page 147 before performing this procedure.

To install 10 Gbps SFP+ transceivers in the AT-SBx81XS6 Line Card, perform the following procedure:

1. Remove the dust plug from the slot chosen for an SFP+ transceiver. Figure 91 shows the dust plug removed from slot 1.

Figure 91. Removing the Dust Cover from an SFP+ Slot in the AT-SBx81XS6 Line Card

Note
Do not remove the dust plug from the SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Orient the SFP+ transceiver with the handle on top, as shown in Figure 92 on page 153.

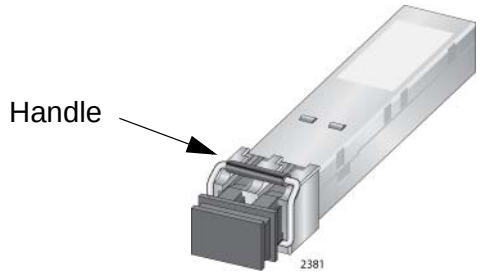


Figure 92. Handle on SFP+ Transceiver

3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 93.

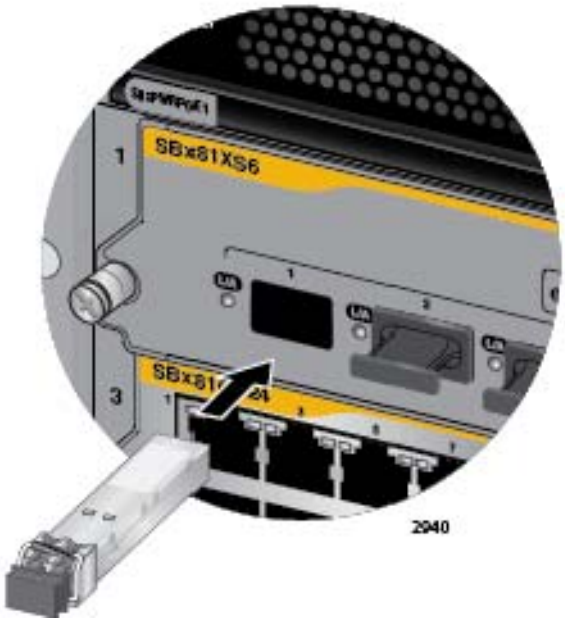


Figure 93. Installing an SFP+ Transceiver in the AT-SBx81XS6 Line Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 3 to install the remaining SFP+ transceivers in the line card.

4. Remove the protective cover from the SFP+ transceiver, as shown in Figure 94 on page 154.

Figure 94. Removing the Dust Cover from an SFP+ Transceiver in the AT-SBx81XS6 Line Card

Note
The dust cover protects the fiber optic port on the SFP transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

5. Before connecting the cable, verify the position of the handle on the SFP+ transceiver. The handle should be in the up position, as shown in Figure 95.

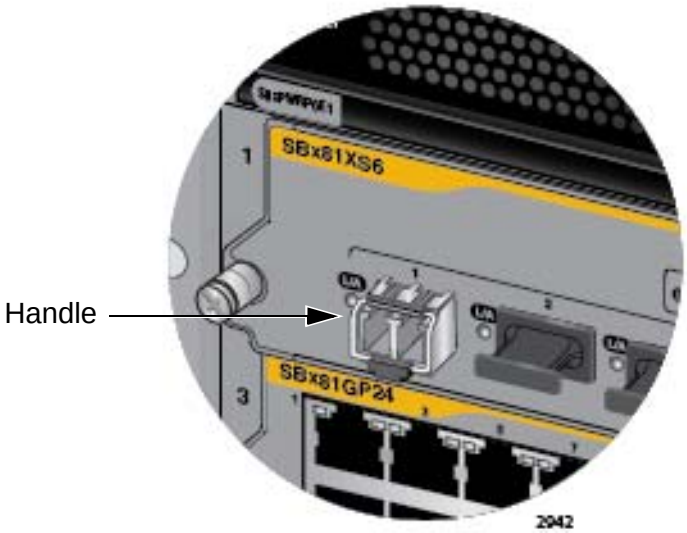


Figure 95. Verifying the Position of the Handle on the SFP+ Transceiver in the AT-SBx81XS6 Line Card

6. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 96. The connector should snap into the port.

Figure 96. Attaching a Fiber Optic Cable to an SFP+ Transceiver in the AT-SBx81XS6 Line Card

7. Repeat this procedure to install additional SFP plus transceivers in the AT-SBx81XS6 Line Cards.

After installing and cabling the SFP+ transceivers, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Installing AT-SP10TW Cables in the AT-SBx81XS6 Line Card

This procedure explains how to connect AT-SP10TW Cables to the AT-SBx81XS6 Line Card. The cables may be used in place of fiber optic cables and transceivers for 10 Gbps links of up to 7 meters.

Note
The AT-SP10TW Cable is supported in the AT-SBx81XS6 and AT-SBx81XS16 Line Cards. It is not supported in the AT-SBx81GS24a Line Card or AT-SBx81CFC960 Controller Fabric Card.

To install the AT-SP10TW Cable, perform the following procedure:

1. Remove the dust plug from an SFP+ slot on the line card. You may install AT-SP10TW Cables into any of the slots on the line card. Refer to Figure 97.

Figure 97. Removing the Dust Cover From an SFP+ Slot in the AT-SBx81XS6 Line Card

Note
Do not remove the dust plug from the SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Orient the connector on the AT-SP10TW cable so that the release tab is on top, as shown in Figure 98 on page 157.

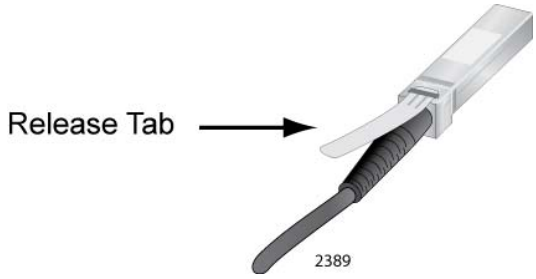


Figure 98. Release Tab on the AT-SP10TW Cable

3. Slide the connector into the slot until it clicks into place, as shown in Figure 99.

Figure 99. Installing the AT-SP10TW Cable in the AT-SBx81XS6 Line Card

4. Install the other end of the cable into an SFP+ slot on another network device.

5. Repeat this procedure to install additional AT-SP10TW Cables.

Note
To remove the connector and cable from the SFP+ slot, gently push on the connector, pull on the release tab, and slide the connector from the slot.

After installing the AT-SP10TW Cables, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Installing SFP+ Transceivers in the AT-SBx81XS16 Line Card

Please review the information in “Guidelines to Installing SFP and SFP+ Transceivers” on page 147 before performing this procedure.

To install 10Gbps SFP+ transceivers in the AT-SBx81XS16 Line Card, perform the following procedure:

1. Remove the dust plug from the slot chosen for the transceiver. Figure 100 shows the dust plug removed from slot 1.

Figure 100. Removing the Dust Cover from a Transceiver Slot in the AT-SBx81XS16 Line Card

Note
Do not remove the dust plug from the transceiver slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Slide the transceiver in the slot until it clicks into place.

   To install the transceiver into an odd numbered slot, position it with the handle is on top as you slide it into the slot. To install the transceiver into an even numbered slot, position it with the handle on the bottom. Refer to Figure 101 on page 160.

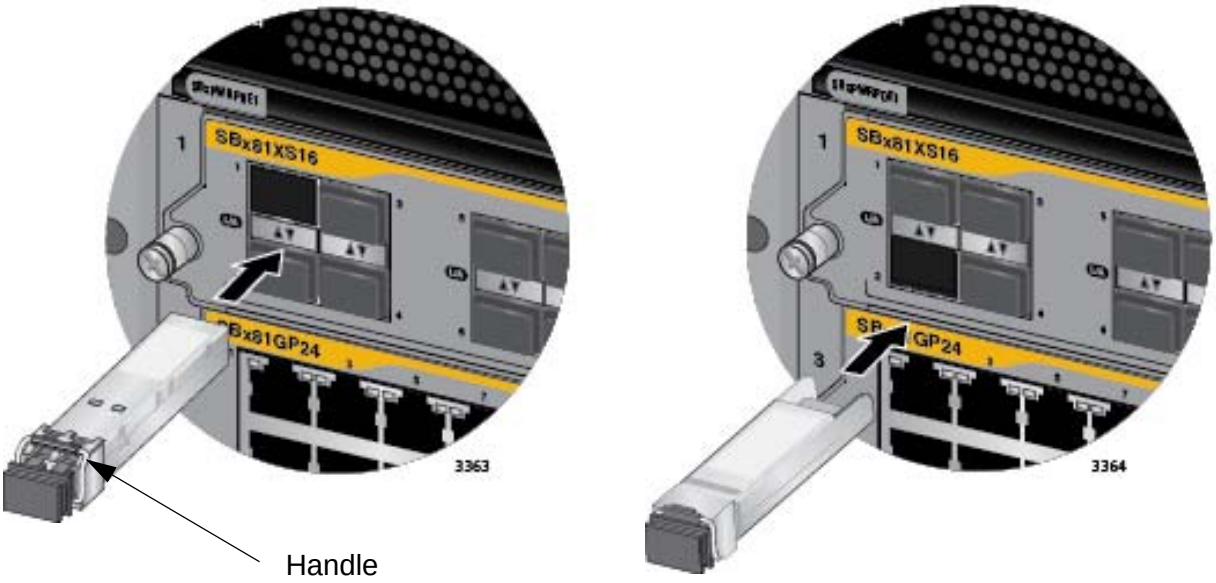


Figure 101. Installing a Transceiver in the AT-SBx81XS16 Line Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 2 to install the remaining SFP transceivers in the line cards.

3. Remove the protective cover from the transceiver, as shown in Figure 102.

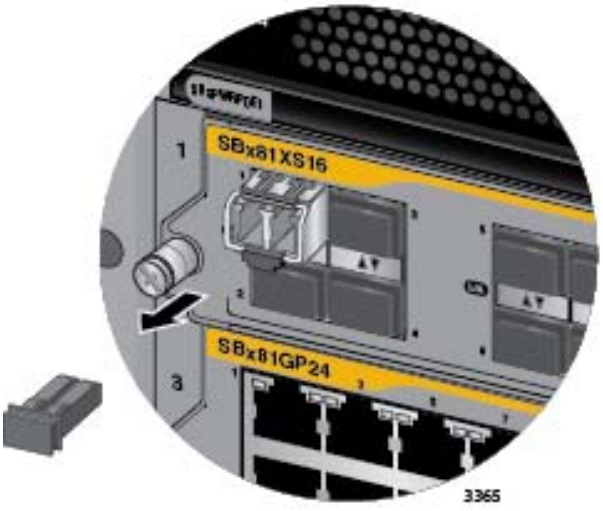


Figure 102. Removing the Dust Cover from a Transceiver in the AT-SBx81XS16 Line Card

Note
The dust cover protects the fiber optic port on the transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

4. Before connecting the cable, verify the position of the handle on the transceiver. If the transceiver is in an odd numbered slot, the handle should be in the upright position, as shown in Figure 103. If the transceiver is in an even numbered slot, the handle should be in the down position.

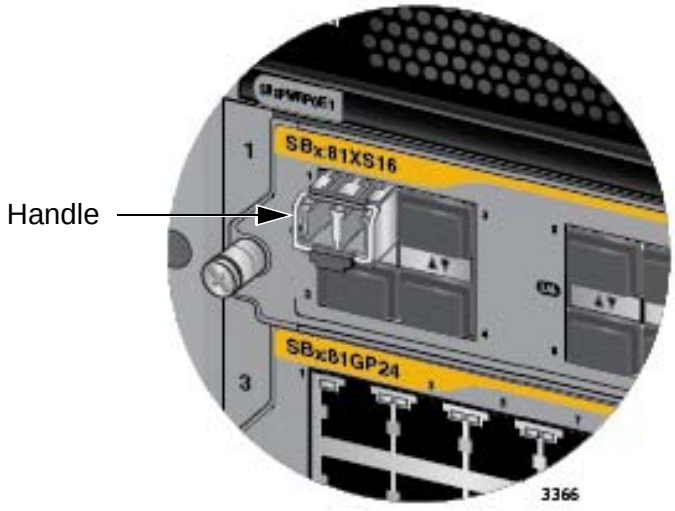


Figure 103. Verifying the Position of the Handle on the Transceiver in the AT-SBx81XS16 Line Card

5. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 104 on page 162. The connector should snap into the port.

Figure 104. Attaching a Fiber Optic Cable to a Transceiver in the AT-SBx81XS16 Line Card

6. Repeat this procedure to install additional transceivers in the AT-SBx81XS16 Line Cards.

After installing and cabling the transceivers, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 169.

Installing AT-SP10TW Cables in the AT-SBx81XS16 Line Card

This procedure explains how to connect AT-SP10TW Cables to AT-SBx81XS16 Line Cards. The cables may be used in place of fiber optic cables and transceivers for 10 Gbps links of up to 7 meters.

Note
The AT-SP10TW Cable is supported in the AT-SBx81XS6 and AT-SBx81XS16 Line Cards. It is not supported in the AT-SBx81GS24a Line Card or AT-SBx81CFC960 Controller Fabric Card.

To install AT-SP10TW Cables, perform the following procedure:

1. Remove the dust plug from one of the SFP+ slots. You may install AT-SP10TW Cables into any of the slots on the line card. Refer to Figure 97.

Figure 105. Removing the Dust Cover From an SFP+ Slot on the AT-SBx81XS16 Line Card

Note
Do not remove the dust plug from an SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Slide the connector on the AT-SP10TW Cable into the slot until it clicks into place, as shown in Figure 99.

   To install the cable into an odd numbered slot, position the release tab on top as you slide the connector into the slot. To install the cable in an

even numbered slot, position the connector so that the release tab is on the bottom.

Figure 106. Installing the AT-SP10TW Cable in the AT-SBx81XS16 Line Card

3. Install the other end of the cable into an SFP+ slot on another network device.

4. Repeat this procedure to install additional AT-SP10TW Cables.

Note
To remove the connector and cable from the SFP+ slot, gently push on the connector, pull on the release tab, and slide the connector from the slot.

After installing the AT-SP10TW Cables, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Cabling the NET MGMT Port on the AT-SBx81CFC960 Card

For background information on the NET MGMT port on the controller card, refer to “Ethernet Management Port (NET MGMT)” on page 73.

Note
The NET MGMT port is referred to as “eth0” in the management software.

Here are the guidelines to using the NET MGMT port:

- The cabling requirements of the port are the same as the ports on the AT-SBx81GT24 Line Card, in Table 12 on page 54.
- The default speed setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed speed or 10 or 100 Mbps. In this situation, disable Auto-Negotiation and set the port’s speed manually to match the speed of the network device.
- The port must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation for the duplex mode.
- The default duplex mode setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed duplex mode. In this situation, you should disable Auto-Negotiation on the port and set its duplex mode manually to avoid the possibility of a duplex mode mismatch. With Auto-Negotiation, the port defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- The default wiring configuration of the port is automatic MDIX detection, which configures the MDI/MDIX setting automatically. This setting is appropriate for port if it is connected to a network device that also support the feature.
- The default wiring configuration of automatic MDIX detection is not appropriate for the NET MGMT port if it is connected to a network device that does not support the feature. You should disable automatic MDIX detection and set the wiring configuration manually with the POLARITY command.

After cabling the NET MGMT port, do one of the following:

- ❒ To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- ❒ After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Installing SFP+ Transceivers in the AT-SBx81CFC960 Card

The AT-SBx81CFC960 Controller Fabric Card has four slots for 10Gbps SFP+ transceivers. The transceivers can be used for high-speed links to network servers, switches, routers, or other network devices. A list of supported SFP+ transceivers can be found on the Allied Telesis web site.

Note
The transceiver slots on the controller card do not support 1000Mbps SFP transceivers.

Note
Do not install transceivers in the SFP+ slots on the controller card yet if you are building a stack with the VCStack Plus feature. The stacking transceivers should be installed after you have configured the chassis for stacking, as explained in Chapter 15, “Building a Stack” on page 283.

To install a 10Gbps SFP+ transceiver in a transceiver slot in the controller card, perform the following procedure:

1. Remove the dust plug from the slot chosen for the SFP+ transceiver. Refer to Figure 107.

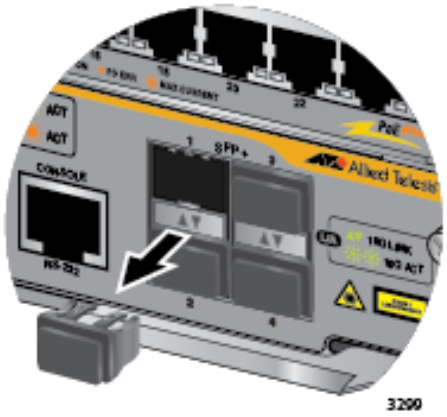


Figure 107. Removing a Dust Cover from an SFP+ Slot in the AT-SBx81CFC960 Controller Fabric Card

Note
To protect the controller card from dust contamination, do not remove the dust plug from a transceiver slot until you are ready to install the transceiver.

2. If you are installing the SFP+ transceiver in slot 1 or 3, orient it with the handle on top, as shown in Figure 108. To install it in slot 2 or 4, orient it with the handle on the bottom.

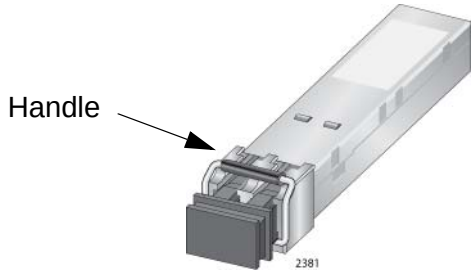


Figure 108. Handle on an SFP+ Transceiver

3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 109.

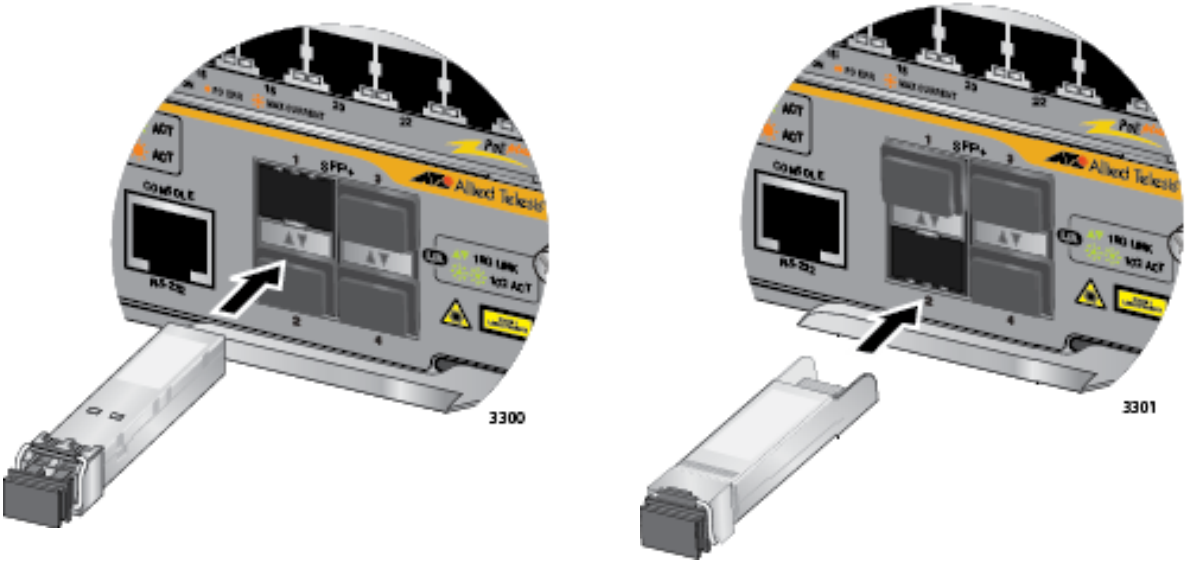


Figure 109. Installing an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 3 to install additional SFP+ transceivers in the card.

4. Remove the protective cover from the STP+ transceiver, as shown in Figure 110 on page 169.

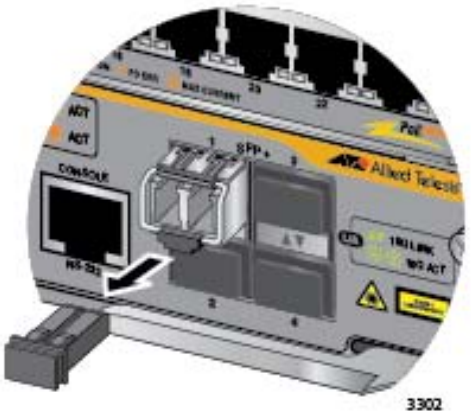


Figure 110. Removing the Dust Cover from an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

Note
The dust cover protects the fiber optic port on the SFP+ transceiver from dust contamination. Do not remove it until you are ready to connect the fiber optic cable.

5. Verify the position of the handle on the transceiver. If the transceiver is in slot 1 or 3, the handle should be in the upright position, as shown in Figure 111. If the transceiver is in slot 2 or 4, the handle should be in the down position.

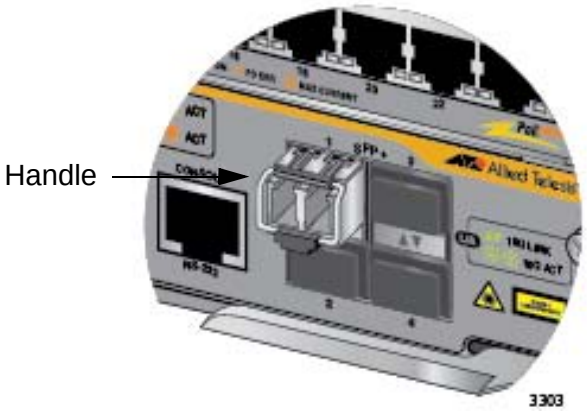


Figure 111. Positioning the Handle on the Transceiver

6. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 112 on page 170. The connector should snap into the port.

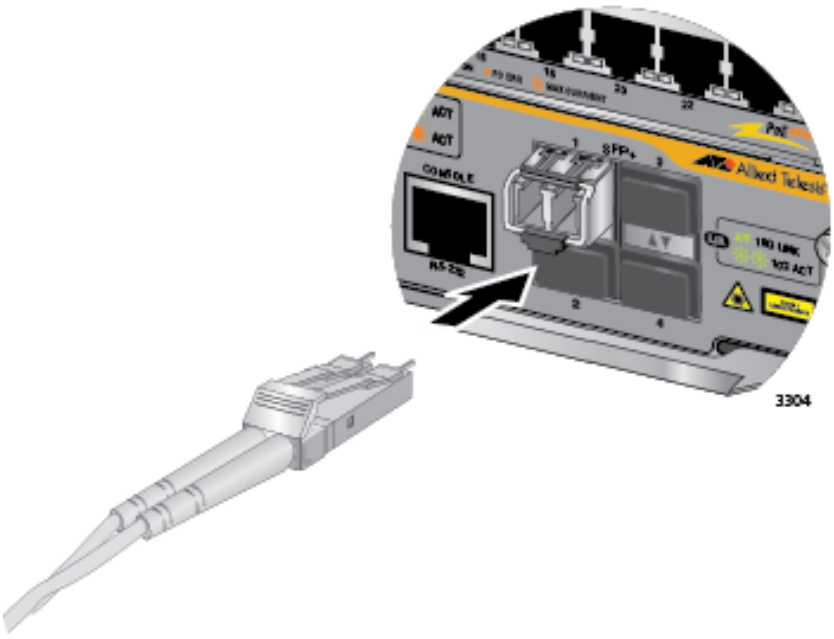


Figure 112. Attaching a Fiber Optic Cable to an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

7. Repeat this procedure to install additional SFP+ transceivers in the AT-SBx81CFC960 Controller Fabric Card.

After cabling the SFP+ transceivers in the AT-SBx81CFC960 Controller Fabric Card, do one of the following:

- To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- After cabling all the ports in the chassis, go to Chapter 9, “Powering On the Chassis” on page 171.

Chapter 9

Powering On the Chassis

This chapter describes how to power on the chassis and monitor the initialization process. The chapter contains the following sections:

- “Verifying the Installation” on page 172
- “Powering On the AT-SBxPWRSYS1 AC System Power Supply” on page 173
- “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176
- “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 179
- “Monitoring the Initialization Process” on page 205

Verifying the Installation

Please perform the following procedure before powering on the chassis:

1. Verify that the grounding lug on the back panel of the chassis is properly grounded. For instructions, refer to “Installing the Chassis Grounding Wire” on page 105.

2. Verify that all empty slots on the front panel of the chassis are covered with slot covers. If there are open slots, perform the procedure “Installing the Blank Slot Covers” on page 140.

3. Verify that dust plugs are installed in all empty SFP and SFP+ slots on the AT-SBx81GS24a and AT-SBx81XS6 Line Cards, and the AT-SBx81CFC960 Controller Fabric Card.

4. Verify that dust covers are installed on all SFP and SFP+ transceivers that do not have cables.

5. Verify that the chassis has at least one AT-SBx81CFC960 Controller Fabric Card in slot 5 or 6.

6. Verify that the chassis has at least one AT-SBxPWRSYS1 Power Supply in slot C or D.

7. If the chassis has AT-SBx81GP24 Line Cards, verify that the chassis has at least one AT-SBxPWRPOE1 Power Supply in slot A or B.

8. When you installed the AT-SBx81CFC960 Controller Fabric Card, did you remove the battery insulator, shown in Figure 71 on page 132? If not, remove the controller card from the chassis, remove the insulator from the battery, and reinstall the card.

You may now power on the chassis. For instructions, refer to the appropriate section in this chapter:

- “Powering On the AT-SBxPWRSYS1 AC System Power Supply” on page 173
- “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176
- “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 179

If the chassis has multiple power supplies, you may power them on in any order or simultaneously.

Powering On the AT-SBxPWRSYS1 AC System Power Supply

The procedure in this section explains how to power on the AT-SBxPWRSYS1 AC Power Supplies in slots C and D on the front panel. If you have not installed the power supplies, refer to “Installing the AT-SBxPWRSYS1 AC System Power Supply” on page 109 for installation instructions.

Note
If the chassis has both AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies, you may power on the power supplies in any order or simultaneously.

To power on the chassis, perform the following procedure:

1. Identify AC sockets C and D in the recessed panel on the back panel of the chassis, shown in Figure 113. These sockets are for the AT-SBxPWRSYS1 System Power Supplies in slots C and D on the front panel of the chassis.

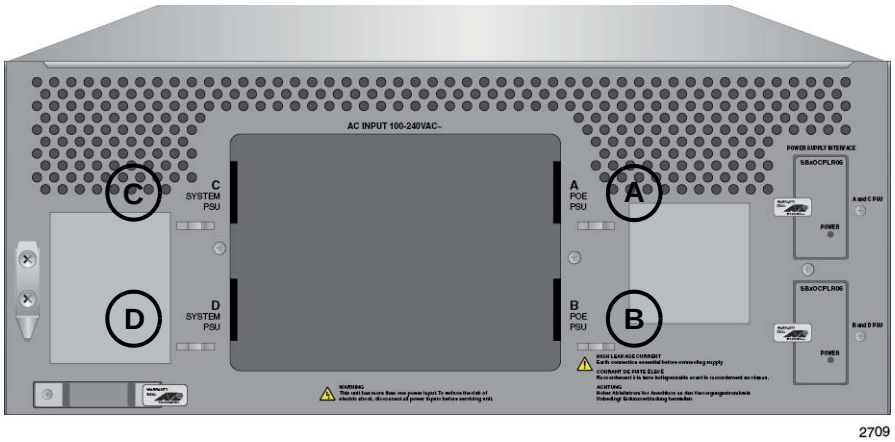


Figure 113. AC Sockets on the Rear Panel of the AT-SBx8106 Chassis

2. Plug the AC power cord that comes with the power supply into a plug whose corresponding slot on the front panel has a system power supply.

   If there are two system power supplies, you may power on either supply first. In the illustration in Figure 114 on page 174 an AC power cord is connected to connector D for the system power supply in slot D on the front panel.

Figure 114. Connecting the AC Power Cord for the AT-SBxPWRSYS1 AC Power Supply

3. Use the twist tie included with the power supply to secure the cord to an anchor on the chassis to protect it from being accidentally pulled out, as shown in Figure 115 on page 175.

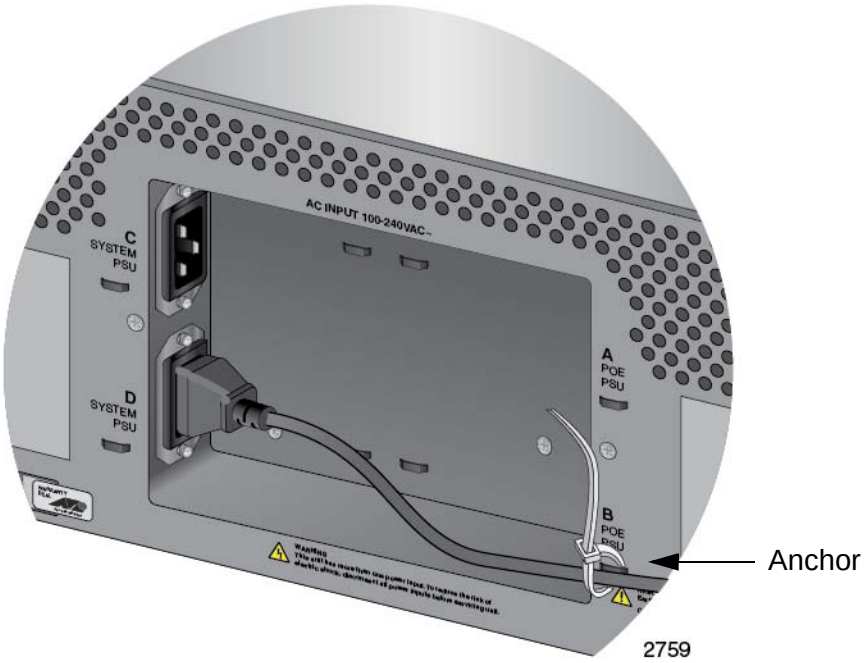


Figure 115. Securing the Power Cord for the AT-SBxPWRSYS1 AC Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.

5. If the chassis has two AT-SBxPWRSYS1 AC System Power Supplies, repeat this procedure to power on the second power supply.

After powering on the AT-SBxPWRSYS1 AC System Power Supplies, do one of the follow:

- ❒ If the chassis has AT-SBxPWRPOE1 PoE Power Supplies, perform the procedure in “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176.
- ❒ Otherwise, go to “Monitoring the Initialization Process” on page 205.

Powering On the AT-SBxPWRPOE1 Power Supply

If you have not already installed the AT-SBxPWRPOE1 Power Supplies, refer to “Installing the AT-SBxPWRPOE1 PoE Power Supply” on page 115 for installation instructions. To power on the power supplies, perform the following procedure:

1. Identify AC sockets A and B in the recessed panel on the back panel of the chassis, shown in Figure 113 on page 173. The sockets are for the AT-SBxPWRPOE1 Power Supplies in slots A and B on the front panel of the chassis.

2. Plug the AC power cord that comes with the power supply into one of the plugs, as shown in Figure 116.

   The plug should have a power supply in the corresponding slot in the front panel. If the chassis has two AT-SBxPWRPOE1 Power Supplies, you may power on either supply first.

Figure 116. Connecting the AC Power Cord for the AT-SBxPWRPOE1 Power Supply

3. Use the twist tie that comes with the power supply to secure the cord to an anchor on the chassis, as shown in Figure 117.

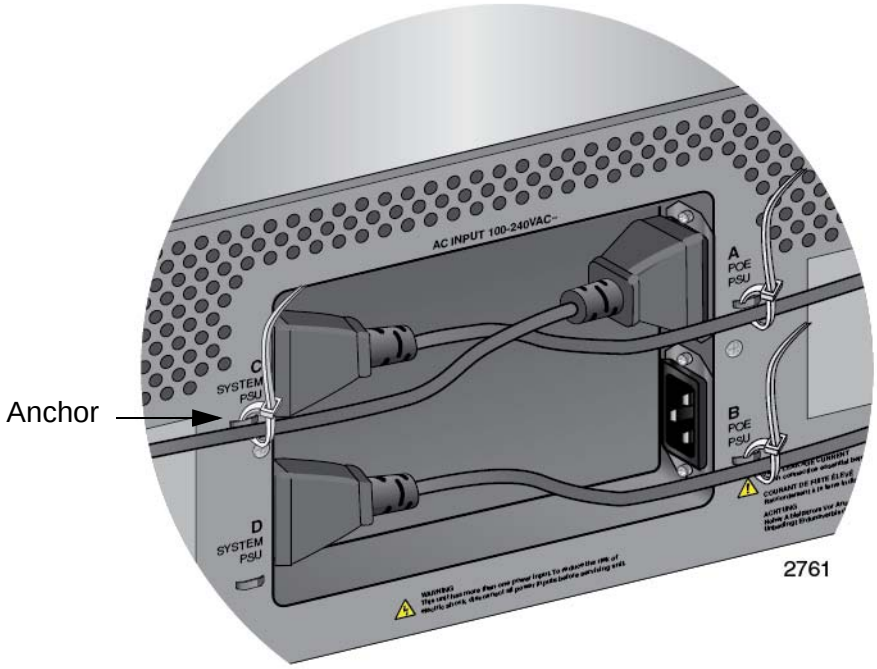


Figure 117. Securing the Power Cord for the AT-SBxPWRPOE1 Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.

5. If the chassis has two AT-SBxPWRPOE1 Power Supplies, repeat this procedure to power on the second power supply.

   Figure 118 on page 178 is an illustration of the power cords for a chassis with four power supplies.

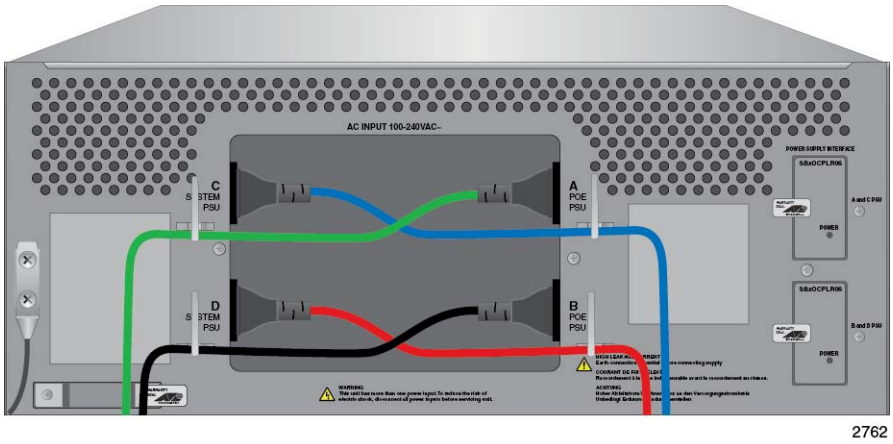


Figure 118. Dress and Secure AC Power Cords

6. Go to “Monitoring the Initialization Process” on page 205.

Powering On the AT-SBxPWRSYS1 DC System Power Supply

This section contains instructions on how to power on the AT-SBxPWRSYS1 DC Power Supply. For installation instructions, refer to “Installing the AT-SBxPWRSYS1 DC System Power Supply” on page 121.

The power supply unit has a ground connection and positive and negative DC terminals. You may install the ground and power lead wires with the terminal lugs that come with the unit or with bare wire. The wire requirements are slightly different for terminal installation versus bare wire installation. Here are the wire requirements if you are using the terminal lugs that come with the power supply:

- Two 8 AWG stranded power wires (not provided)
- One 10 AWG stranded grounding wire (not provided)

Here are the wire requirements for bare wire installation:

- Two 8 AWG solid or stranded power wires (not provided)
- One 10 AWG solid or stranded grounding wire (not provided)

Here is a list of the required tools:

- Crimping tool (not provided)
- 8 mm wrench (not provided)
- #1, #2, and #3 Phillips-head screwdrivers (not provided)
- #3 Phillips-head 30 to 40 inch-lbs Phillips-head torque screwdriver (optional - not provided)

Here are the procedures for powering on the AT-SBxPWRSYS1 DC Power Supply:

- “Choosing a Method for Attaching the Grounding Wire” on page 181
- “Connecting the Grounding Wire with the Grounding Terminal” on page 181
- “Connecting the Grounding Wire with Bare Wire” on page 184
- “Choosing a Method for Attaching the Power Wires” on page 186
- “Connecting the DC Power Wires with the Straight Terminals” on page 186
- “Connecting the DC Power Wires with the Right Angle Terminals” on page 195
- “Connecting Bare DC Power Wires” on page 201

The components of the power supply are identified in Figure 119.

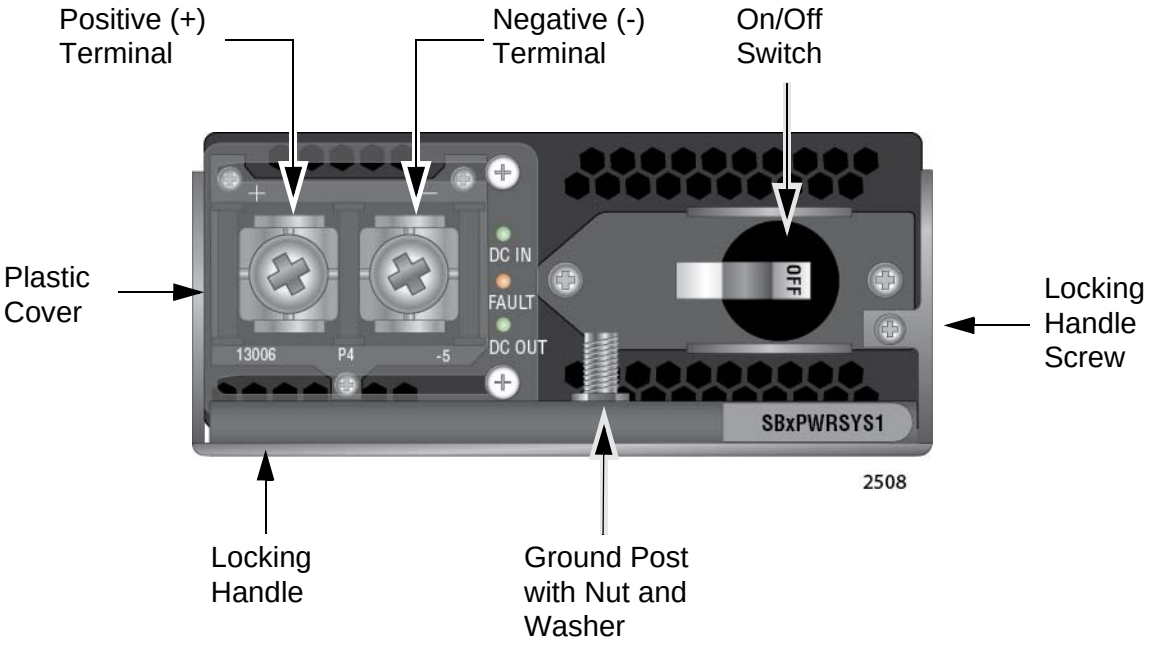


Figure 119. Components of the AT-SBxPWRSYS1 DC Power Supply

Warning
As a safety precaution, install a circuit breaker with a minimum value of 50 Amps between the equipment and the DC power source.

Always connect the wires to the LAN equipment first before you connect the wires to the circuit breaker. Do not work with HOT feeds to avoid the danger of physical injury from electrical shock. Always be sure that the circuit breaker is in the OFF position before connecting the wires to the breaker. E9

Warning
For centralized DC power connection, install only in a restricted access area. E23

Note
A tray cable is required to connect the power source if the unit is powered by centralized DC power. The tray cable must be a UL listed Type TC tray cable and rated at 600 V and 90 degrees C, with two conductors, 8 AWG. E24

Choosing a Method for Attaching the Grounding Wire

You may attach the grounding wire to the power supply using the supplied terminal, shown in Figure 120, or bare wire.

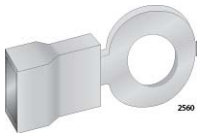


Figure 120. Grounding Wire Terminal

The two methods are described in the following sections:

- ❒ “Connecting the Grounding Wire with the Grounding Terminal”
- ❒ “Connecting the Grounding Wire with Bare Wire” on page 184

Connecting the Grounding Wire with the Grounding Terminal

To attach a grounding wire with the grounding terminal provided with the power supply, perform the following procedure:

1. Prepare an adequate length of stranded 10 AWG grounding wire by stripping it as shown in Figure 121.

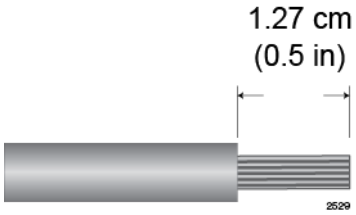


Figure 121. Stripping the Stranded Grounding Wire

Note
You must use stranded wire when using the grounding terminal to connect the ground wire to the grounding post. You may not use solid wire.

2. Insert the grounding wire into the grounding terminal provided with the power supply and use a crimping tool to secure it to the grounding terminal. See Figure 122.

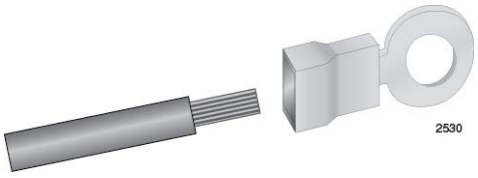


Figure 122. Attaching the Stranded Grounding Wire to the Grounding Terminal

3. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 123, from the power supply.

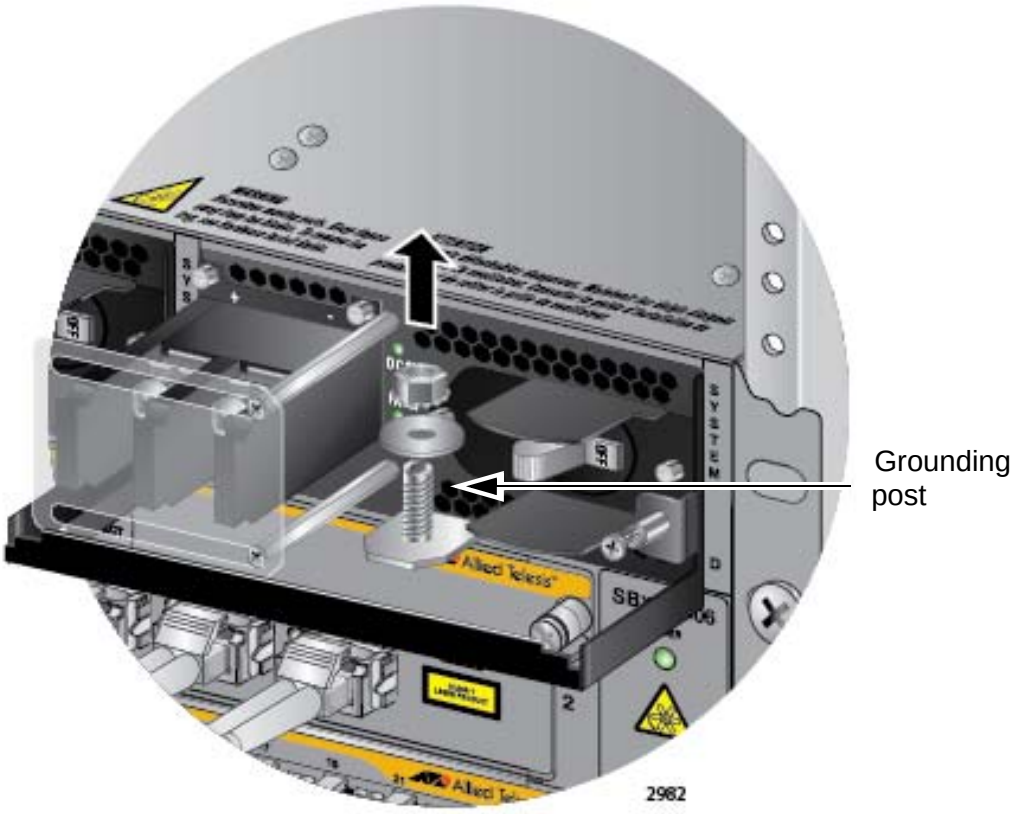


Figure 123. Removing the Nut and Washer from the Grounding Post

4. Attach the grounding lug and wire to the grounding post and secure them with the nut and washer removed in the previous step, and an 8 mm wrench.

   Review the following before installing the grounding wire:

   - ❒ You should angle the wire to the right so that you can open the plastic window to access the positive and negative terminals on the terminal block.
   - ❒ You may route the cable either above or below the locking handle.
   - ❒ Allied Telesis recommends tightening the nut and washer to 26 inch-lbs.

   The grounding wire is illustrated in Figure 124 on page 183.

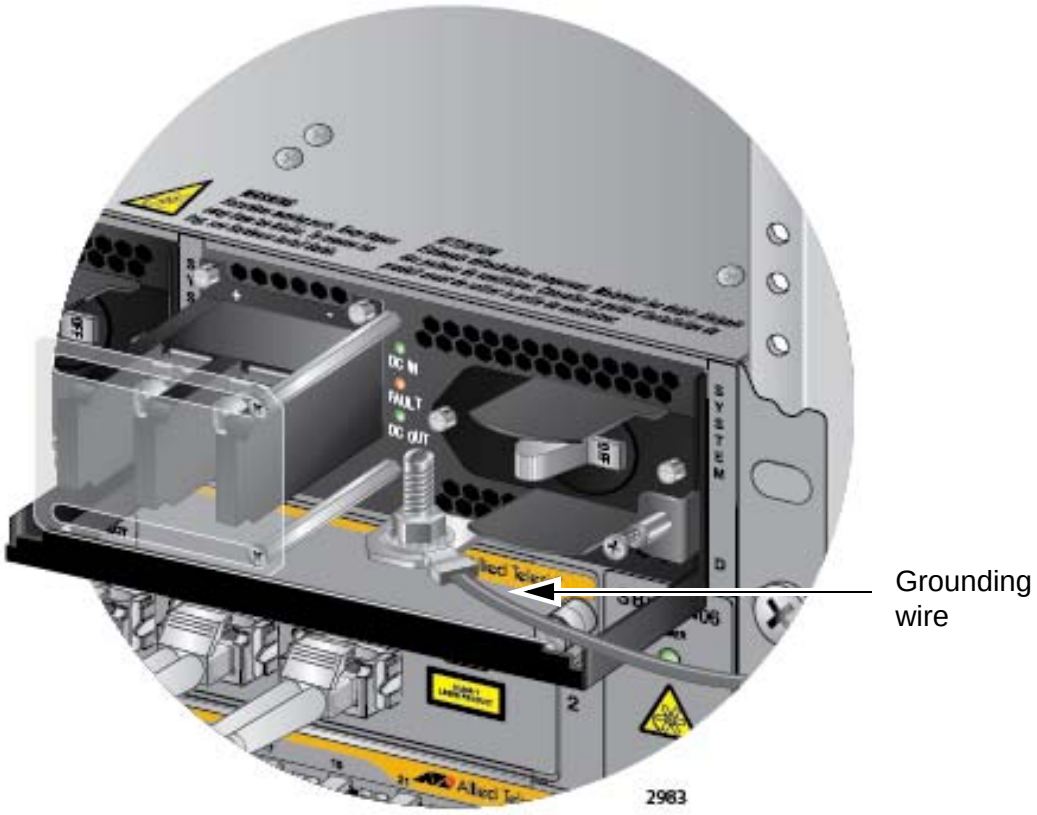


Figure 124. Installing the Grounding Wire

5. Connect the other end of the grounding wire to the building protective earth.

Warning
When installing this equipment, always ensure that the power supply ground connection is installed first and disconnected last. E11

Note
This system will work with a positive grounded or negative grounded DC system. E13

After connecting the grounding wire, go to “Choosing a Method for Attaching the Power Wires” on page 186.

Connecting the Grounding Wire with Bare Wire

To attach the grounding wire to the power supply with bare wire, perform the following procedure:

1. Prepare an adequate length of solid or stranded 10 AWG grounding wire by stripping it as shown in Figure 125.

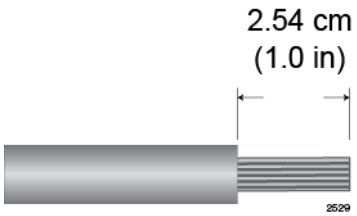


Figure 125. Stripping the solid or Stranded Grounding Wire

2. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 123 on page 182, from the grounding post on the power supply.

3. Wrap the grounding wire clockwise around the base of the grounding post, as shown in Figure 126.

Figure 126. Attaching the Bare Grounding Wire to the Grounding Post

4. Secure the wire with the nut and washer removed in step 2, and an 8 mm wrench, as shown in Figure 127.

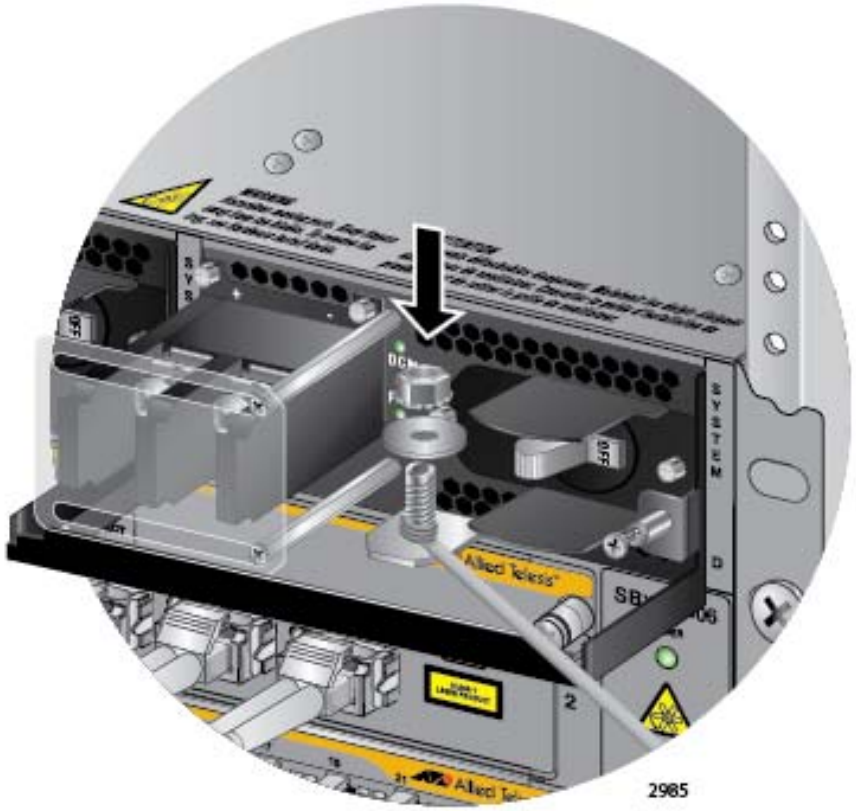


Figure 127. Securing the Bare Grounding Wire to the Grounding Post

Allied Telesis recommends tightening the nut and washer to 26 inch-lbs.

After connecting the grounding wire, go to “Choosing a Method for Attaching the Power Wires” on page 186.

Choosing a Method for Attaching the Power Wires

The AT-SBxPWRSYS1 DC Power Supply comes with the two sets of power wire terminals shown in Figure 128. You may use either set to connect the positive (+) and negative (-) wires to the terminal block on the power supply. The straight terminals are used to route the wires above or below the terminal block. The right angle terminals are used to route the power wires directly away from the terminal block.

Straight Terminals Right Angle Terminals

Figure 128. Power Wire Terminals

Note
The right angle terminals require the removal of the plastic cover from the terminal block.

You may also install the wires using bare wires.

Here are the procedures to wiring the positive and negative terminal block on the power supply:

- ❒ “Connecting the DC Power Wires with the Straight Terminals”
- ❒ “Connecting the DC Power Wires with the Right Angle Terminals” on page 195
- ❒ “Connecting Bare DC Power Wires” on page 201

Connecting the DC Power Wires with the Straight Terminals

To use the straight terminals to connect the DC power wires to the positive and negative terminals on the power supply, perform the following procedure:

1. Prepare adequate lengths of two stranded 8 AWG power wires by stripping them as shown in Figure 129 on page 187.

Warning
Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation. E10

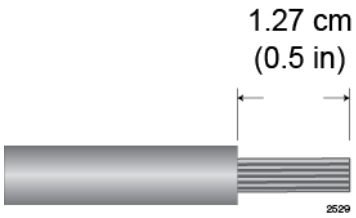


Figure 129. Stripping the Power Wires

Note
You must use stranded wires with the terminal lugs. You may not use solid wires.

2. Insert the power wires into the terminals included with the power supply and use a crimping tool to secure the wires to the terminals. See Figure 130.

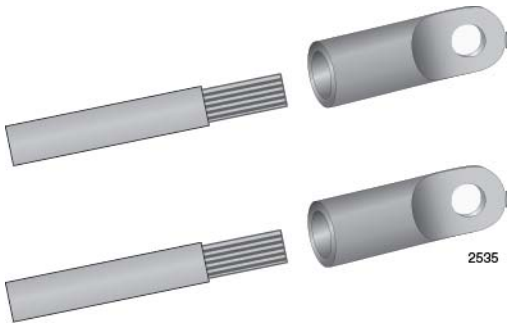


Figure 130. Attaching the Power Wires to the Straight Terminal Lugs

3. Verify that the On/Off switch on the AT-SBxPWRSYS1 DC Power Supply is in the Off position. Refer to Figure 131 on page 188.

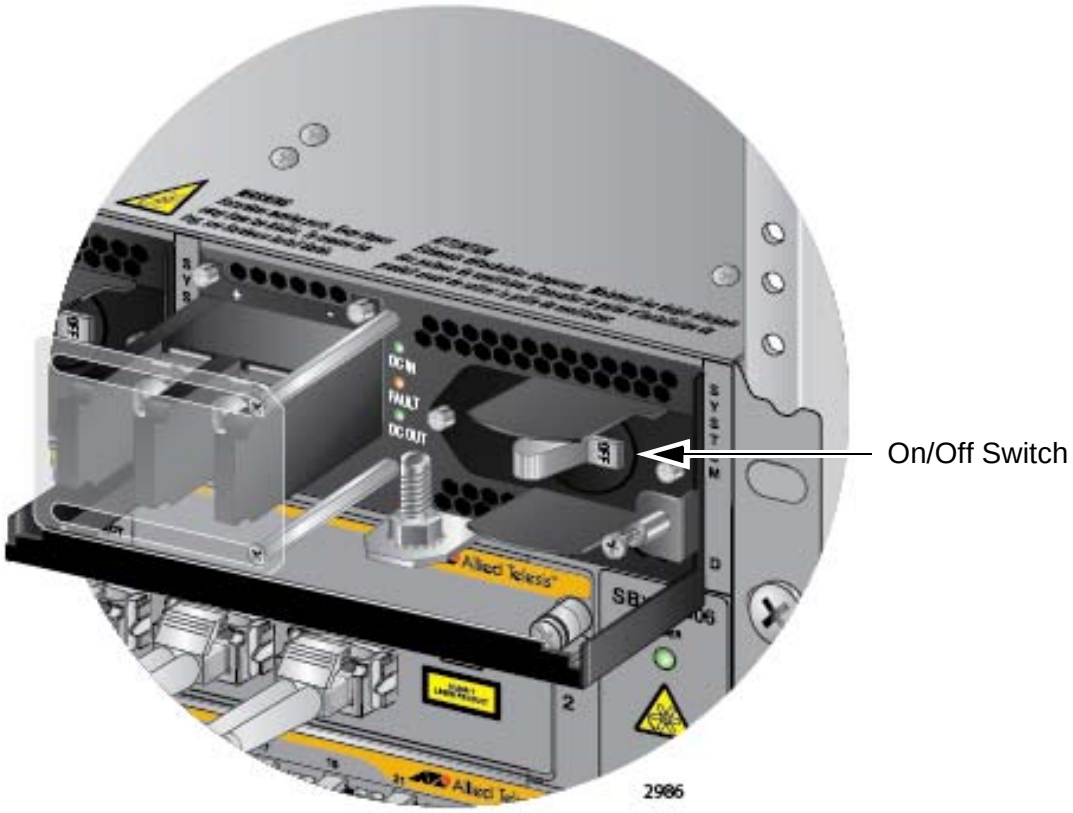


Figure 131. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

4. Use a #1 Phillips-head screwdriver to loosen the two screws on the plastic cover over the positive and negative terminals on the power supply and slide the cover to the right, as shown in Figure 132 on page 189. You may need to slightly lift the locking handle to access the bottom screw.

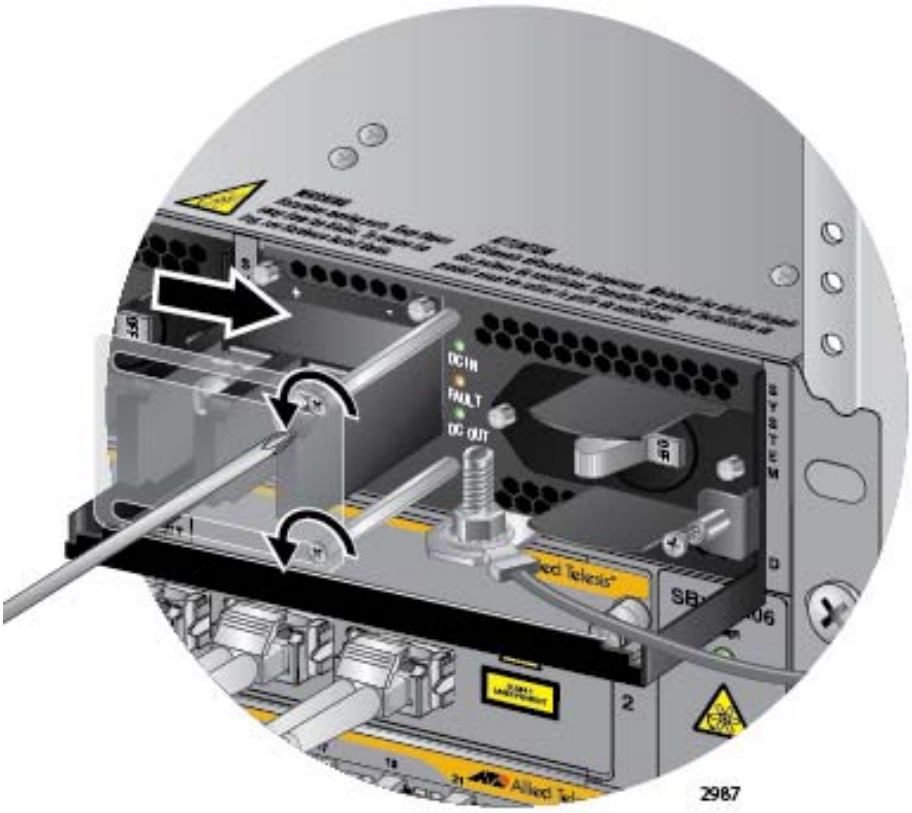


Figure 132. Opening the Plastic Cover

5. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 133 on page 190.

Figure 133. Removing the Terminal Screws

6. With a #3 Phillips-head screwdriver, connect the positive (+) power lead wire to the positive terminal on the power supply, with one of the terminal screws removed in the previous step. The positive terminal is on the left. You may attach the terminals with the wires either above or below the terminal block. Figure 134 on page 191 shows the positive wire above the terminal block.

   Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

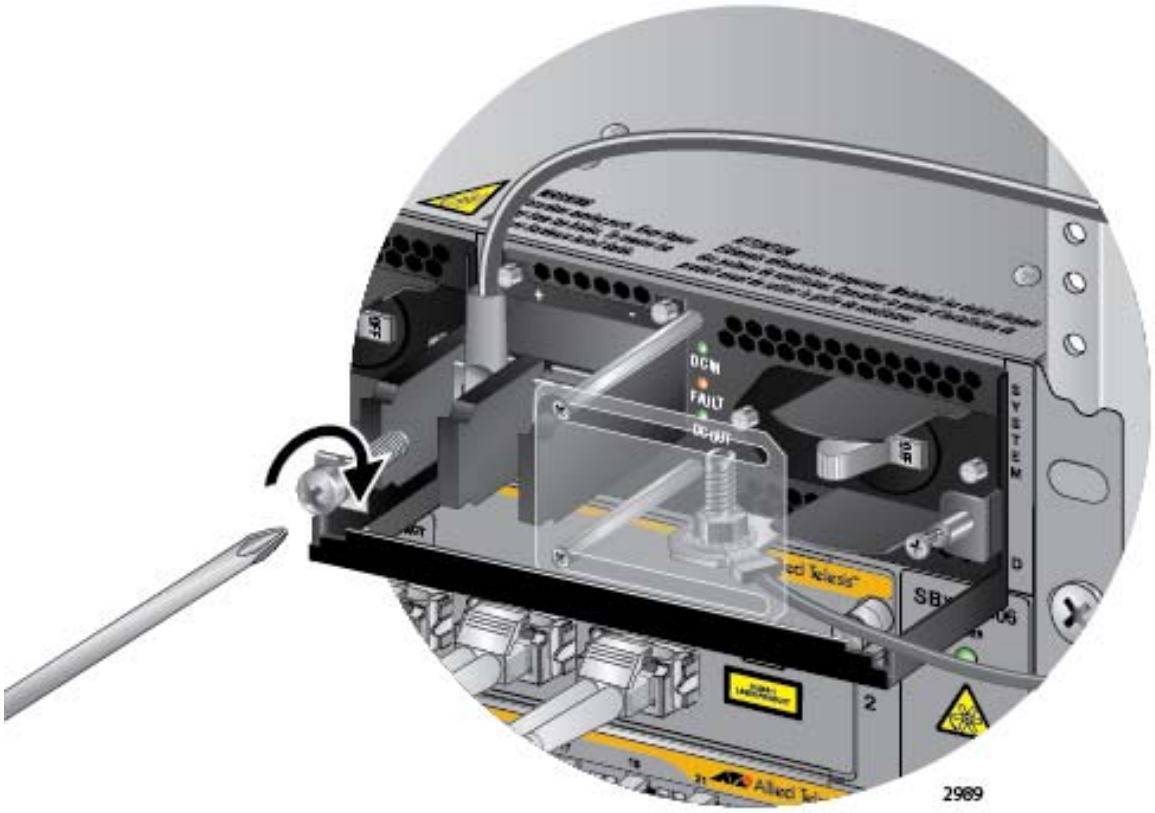


Figure 134. Connecting the Positive (+) Power Wire with a Straight Terminal

7. With a #3 Phillips-head screwdriver, connect the negative (-) power lead wire to the negative terminal on the power supply, with the remaining terminal screw removed in step 5. The negative terminal is on the right. You may attach the terminals with the wires either above or below the terminal block. Figure 135 on page 192 shows the wires above the terminal block.

   Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

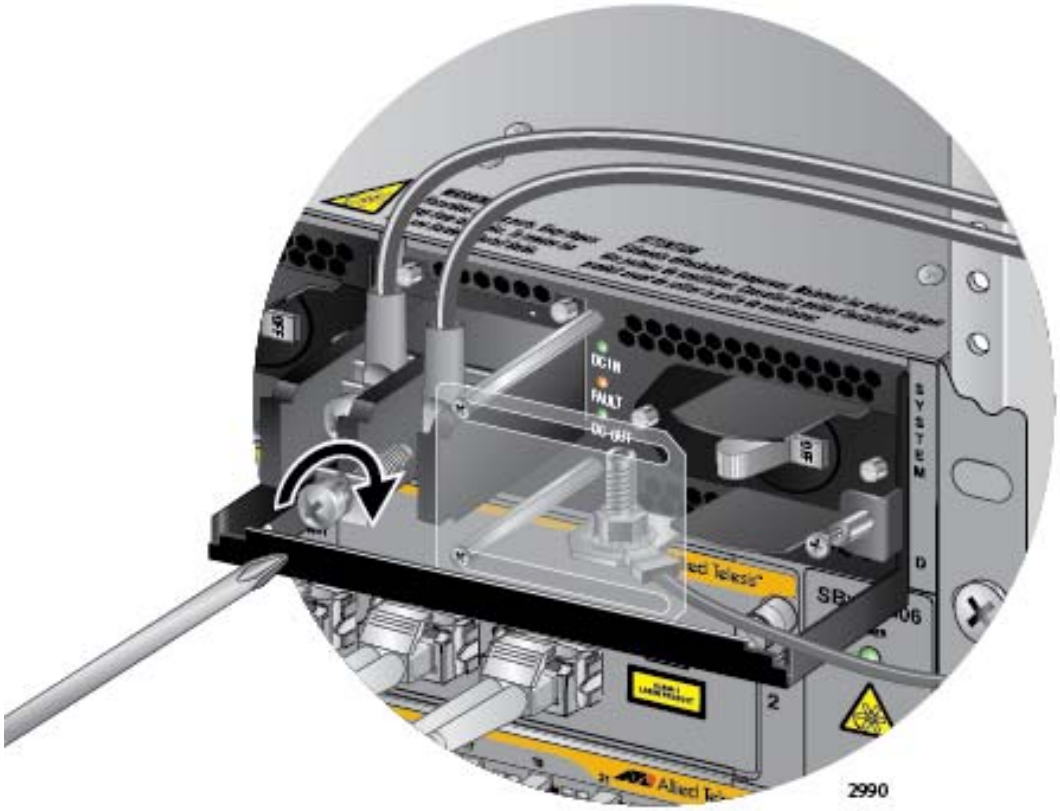


Figure 135. Connecting the Negative (-) Power Wire with a Straight Terminal

Warning
Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. E12

8. Slide the plastic cover to the left and lightly tighten the two screws with a #1 Phillips-head screwdriver to secure the cover. See Figure 136 on page 193. You might need to slightly lift the locking handle to access the bottom screw.

Caution
Do not over tighten the screws or you may crack or break the plastic cover.

Figure 136. Closing the Plastic Cover over the Terminal Connectors

9. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 137 on page 194.

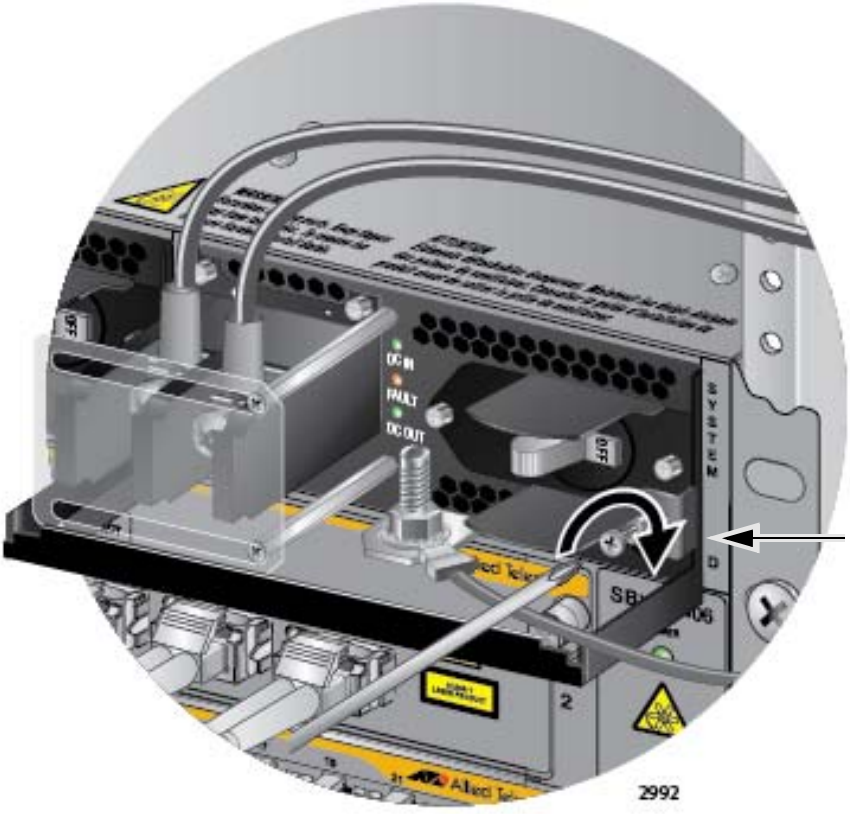


Figure 137. Tightening the Handle Locking Screw

10. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.
11. Connect the power wires to the circuit breaker.
12. Turn the circuit breaker on.
13. Turn the On/Off switch on the power supply to the On position. See Figure 131 on page 188.
14. Do one of the following:
    - ❒ If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to power on the second power supply.
    - ❒ Otherwise, go to “Monitoring the Initialization Process” on page 205.

Connecting the DC Power Wires with the Right Angle Terminals

To connect the DC power wires to the positive and negative terminals on the power supply with the right angle terminals, perform the following procedure:

1. Prepare adequate lengths of two stranded 8 AWG power wires by stripping them as shown in Figure 138.

Warning
Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation. E10

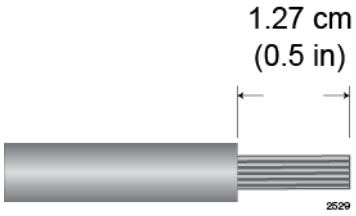


Figure 138. Stripping the Power Wires

Note
You must use stranded wires with the terminal lugs. You may not use solid wires.

2. Verify that the On/Off switch on the AT-SBxPWRSYS1 DC Power Supply is in the Off position. Refer to Figure 131 on page 188.

3. Insert the power wires into the right angle terminals included with the power supply and use a crimping tool to secure the wires to the terminals. See Figure 139,

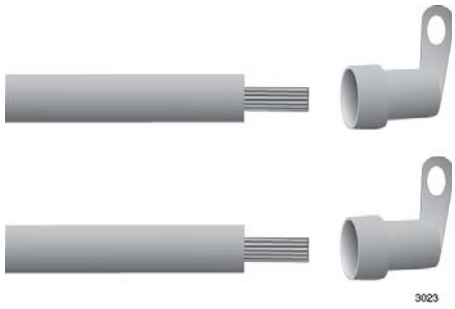


Figure 139. Attaching the Power Wires to the Right Angle Terminals

4. Using a #1 Phillips-head screwdriver, remove the two screws that secure the plastic cover over the positive and negative terminals and remove the plastic cover from the power supply, as shown in Figure 140. You may need to lift the locking handle slightly to access the bottom screw.

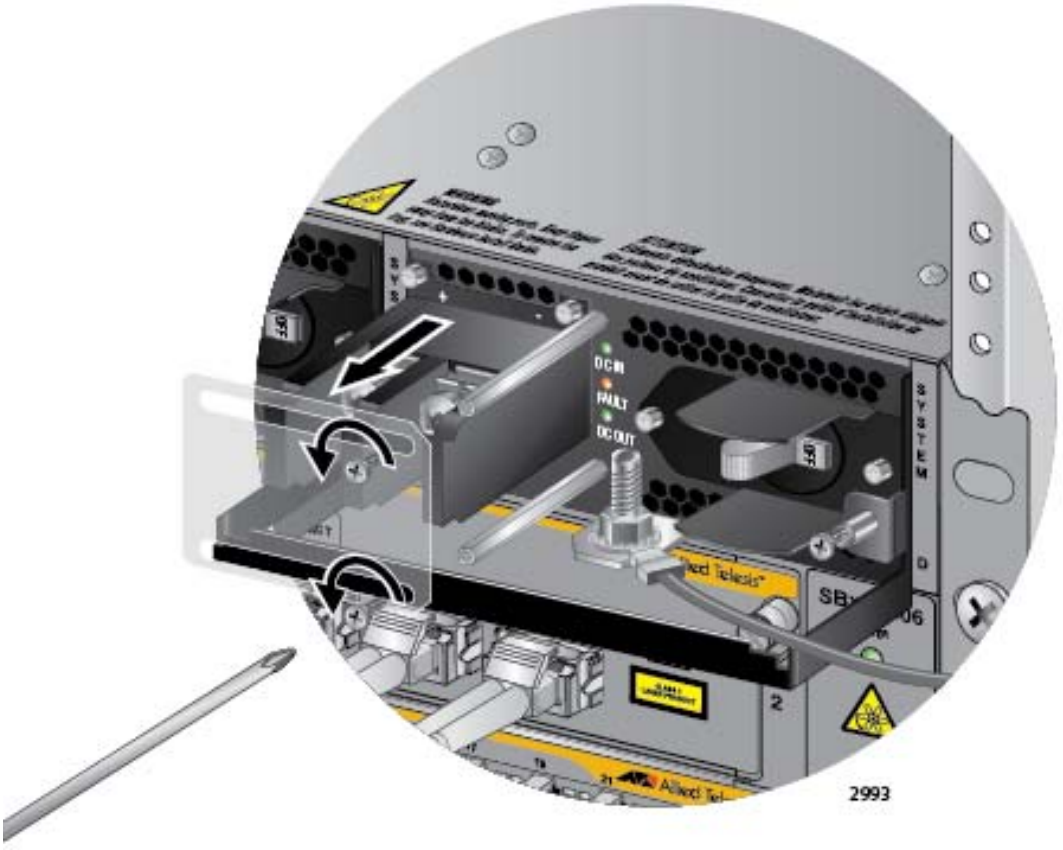


Figure 140. Removing the Plastic Cover

Note
The plastic cover is not used with the right angle terminals.

5. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 141 on page 197.

Figure 141. Removing the Terminal Screws

6. With a #3 Phillips-head screwdriver, connect the positive (+) power lead wire to the positive terminal on the power supply, with one of the terminal screws removed in the previous step. The positive terminal is on the left. Refer to Figure 142 on page 198.

   Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

Figure 142. Connecting the Positive (+) Power Wire with a Right Angle Terminal

7. With a #3 Phillips-head screwdriver, connect the negative (-) power lead wire to the negative terminal on the power supply, with the remaining terminal screw removed in step 5. The negative terminal is on the right. Refer to Figure 143 on page 199.

   Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

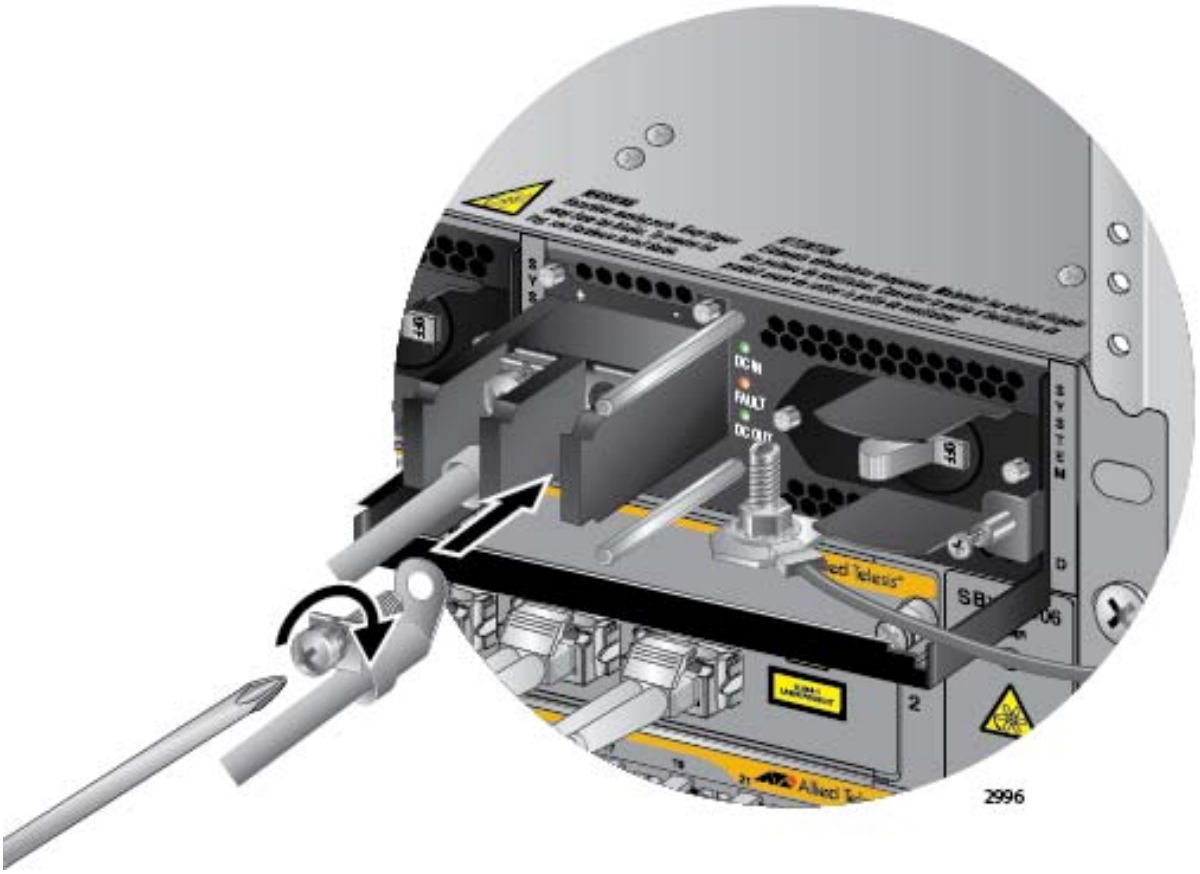


Figure 143. Connecting the Negative (-) Power Wire with a Right Angle Terminal

Warning
Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. E12

8. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 144 on page 200.

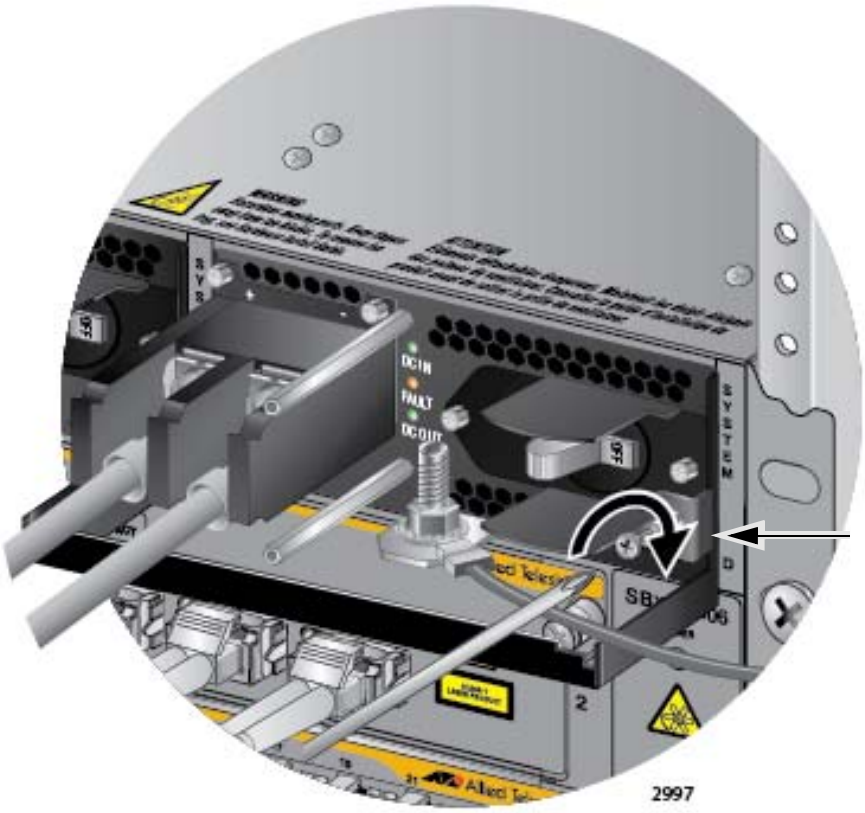


Figure 144. Tightening the Handle Locking Screw

9. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.

10. Connect the power wires to the circuit breaker.

11. Turn the circuit breaker on.

12. Turn the On/Off switch on the power supply to the On position. See Figure 131 on page 188.

13. Do one of the following:

    - If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to power on the second power supply.
    - Otherwise, go to “Monitoring the Initialization Process” on page 205.

Connecting Bare DC Power Wires

To attach bare lead wires to the positive and negative terminals on the power supply, perform the following procedure:

1. Prepare adequate lengths of two solid or stranded 8 AWG DC power wires by stripping them as shown in Figure 145.

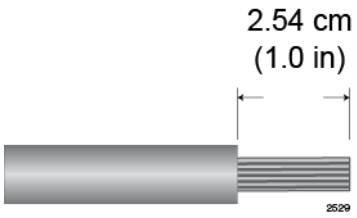


Figure 145. Stripping Solid or Stranded DC Power Wires

2. Use a #1 Phillips-head screwdriver to loosen the two screws on the plastic cover over the positive and negative terminals on the power supply and slide the cover to the right, as shown in Figure 132 on page 189. You may need to lift the locking handle slightly to access the bottom screw.

3. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 133 on page 190.

4. Wrap the positive lead wire clockwise around one of the terminal screws and secure the screw and wire to the positive terminal connection on the terminal block with a #3 Phillips-head screwdriver. The positive terminal is on the left.

   You may attach the wire to the terminal so that it extends either above or below the terminal block. Figure 146 on page 202 shows the wire above the terminal block. Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

Figure 146. Connecting the Positive Lead Wire

5. Wrap the negative lead wire clockwise around the remaining terminal screw and secure the screw and wire to the negative terminal connection on the terminal block with a #3 Phillips-head screwdriver, as shown in Figure 147 on page 203. The negative terminal is on the right.

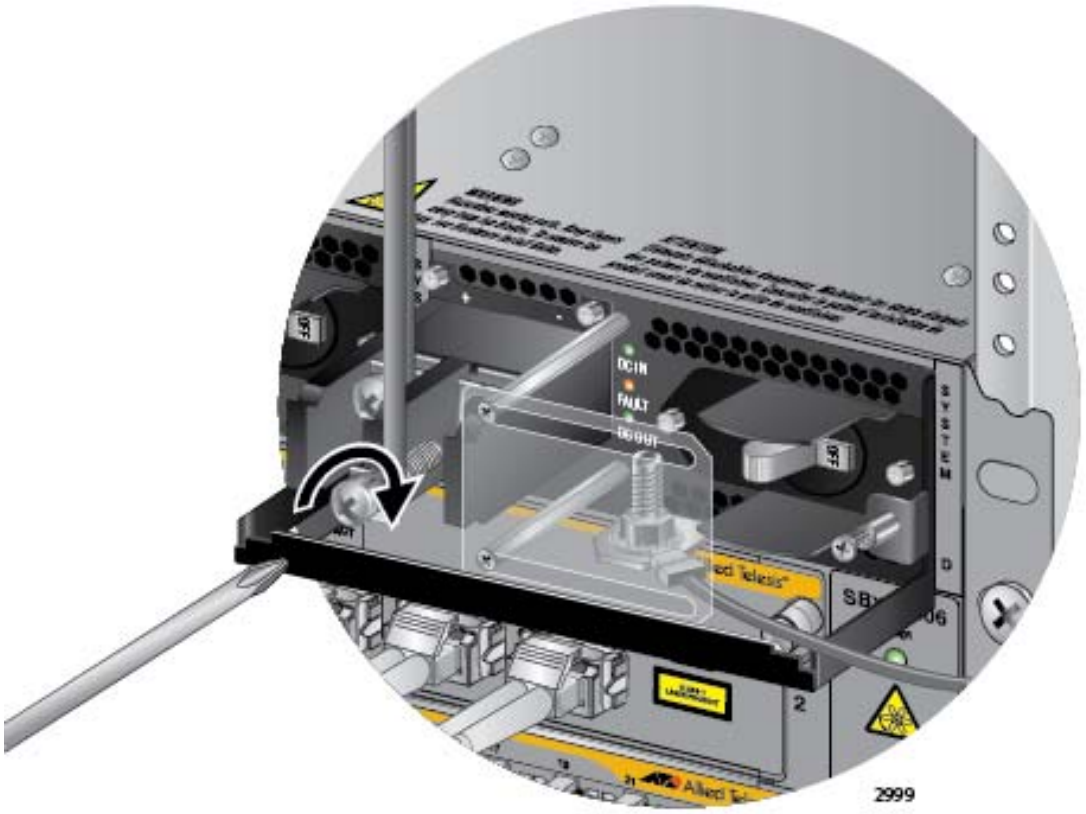


Figure 147. Connecting the Negative Lead Wire

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

Warning
Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. E12

6. Slide the plastic cover to the left and lightly tighten the two screws with a #1 Phillips-head screwdriver to secure the cover. See Figure 136 on page 193. You might need to slightly lift the locking handle to access the bottom screw.

Caution
Do not over tighten the screws or you may crack or break the plastic cover.

7. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 137 on page 194.

8. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.

9. Connect the power wires to the circuit breaker.

10. Turn the circuit breaker on.

11. Turn the On/Off switch on the power supply to the On position. See Figure 131 on page 188.

12. Do one of the following:

    - If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to power on the second power supply.
    - Otherwise, go to “Monitoring the Initialization Process” on page 205.

Monitoring the Initialization Process

The line and controller cards perform an initialization process when you power or reset the chassis. The initialization process takes approximately three minutes to complete. The line cards do not begin to forward traffic from their ports until the process is finished.

The process has two phases:

- In the first phase, which takes approximately two minutes, the controller card loads and initializes its AlliedWare Plus Operating System and, if there are two controller cards in the chassis, sets its active or standby state.
- In the second phase, the Ethernet line cards receive their management software from the active controller card, initialize the software, and configure their parameter settings according to the configurations provided by the active controller card. This phase takes one minute, after which the line cards begin to forward traffic.

You may monitor the initialization process by viewing either the LEDs on the cards or the messages on the Console port, as explained in the following sections.

Using the LEDs to Monitor the Initialization Process

To monitor the first phase of the initialization process in which the controller card initializes its AlliedWare Plus Operating System and establishes its active master or standby master state, examine the CFC LED in the System Status LEDs on the card. The LED flashes green while the card initializes its management software. When this phase is finished, the card changes the LED to solid green if it is the active master or solid amber if it is the standby master.

To monitor phase 2 in which the line cards initialize and configure their management software, watch the SBx Linecard Status LEDs. There are twelve LEDs (numbered 1 to 12), one for each slot. The LED for a slot flashes green while the corresponding line card initializes its management software and configures its settings in accordance with the settings from the active controller card. The LED changes to solid green when the line card completes the initialization process and begins forwarding traffic.

Using the Console Port to Monitor the Initialization Process

Another way to monitor the initialization process of the chassis is to connect a terminal or PC with a terminal emulator program to the Console port on the controller card and watch the status messages. If the chassis has two controller cards, you should use the Console port on the controller card in slot 5. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 212.) Figure 148 on page 206 and Figure 149 on page 207 illustrate the messages. The controller and line cards are fully initialized and forwarding network traffic when the Console port displays the “awplus

login” prompt.

```
Verifying release... OK
Booting...
Starting base/first...                              [ OK ]
Mounting virtual filesystems...                     [ OK ]

          _______________ ____
        /\ \             / /____\
      /   \ \      __/ /| ______ |
    /      \ T     |_ / | ______ |
  /         \ \    / /  \ ____ /
 /_____/\____\ \/ /_____________/

Allied Telesis Inc.
AlliedWare Plus (TM) v5.4.4
Current release filename: SBx81CFC960-5.4.4-0.0.rel
Original release filename: SBx81CFC960-5.4.4-.0.rel
Built: Thu Dec 19 21:30:52 NZDT 2013
Mounting static filesystems...                      [ OK ]
Checking flash filesystem...                        [ OK ]
Mounting flash filesystem...                        [ OK ]
Checking for last gasp debug output...              [ OK ]
Checking NVS filesystem...                          [ OK ]
Mounting NVS filesystem...                          [ OK ]
Starting base/setup-eth..                           [ OK ]
Starting base/dbus...                               [ OK ]
Starting base/syslog...                             [ OK ]
Starting base/lif_ok...                             [ OK ]
Starting base/loopback...                           [ OK ]
Starting base/poe_done...                           [ OK ]
Starting base/sysctl...                             [ OK ]
.
.
.
Received event modules.done
Received event board.inserted
Received event hardware.done
Starting network/startup...                         [ OK ]
Starting base/external-media...                     [ OK ]
Starting network/stackd...                          [ OK ]
Starting network/internal-tftpd...                  [ OK ]
Starting network/internal-boop...                   [ OK ]
08:00:46 awplus-1.5 chassis[2138]: Card 1.6 (AT-SBx81CFC960) has joined the
chassis
Received event network enabled

Initializing HA processes:
exfx, hostd, hsl, nms, atmfd, auth, bgpd
cntrd, epsr, imi, imiproxyd, irdpd, lacp, lldpd
loopprot, mstp, ospf6d, ospfd, pdmd, pim6d, pimd
ripd, ripngd, rmon, sflowd, udidd, vrrpd
```

Figure 148. Switch Initialization Messages

```
Received event network.active
08:00:54 awplus-1.5 chassis[2138]: Card 1.2 (AT-SBx81GT24) has joined the
chassis
08:00:54 awplus-1.5 chassis[2138]: Card 1.1 (AT-SBx81GT24) has joined the
chassis
08:00:55 awplus-1.5 chassis[2138]: Card 1.3 (AT-SBx81XS6) has joined the
chassis
08:00:55 awplus-1.5 chassis[2138]: Card 1.4 (AT-SBx81GP24) has joined the
chassis
08:00:56 awplus-1.5 chassis[2138]: Stack Virtual MAC is 0000.cd37.0131
Received event vcs.elected-master

Assigning Active Workload to HA processes:
hsl, nms, sflowd, authd, bgpd, epsrd, imi
imiproxyd, irdpd, lacpd, lldpd, loopprot, mstpd, ospf6d
ospfd, pdmd, pim6d, pimd, ripd, ripngd, rmond
vrrpd

Received event network activated

Loading default configuration

done!
Received event network.configured

awplus login:
```

Figure 149. Switch Initialization Messages (Continued)

Chapter 10

Verifying the Hardware Operations of the Chassis

This chapter describes how to verify the operations of the chassis. The chapter contains the following sections:

- “Using the LEDs to Verify the Chassis” on page 210
- “Using Local Management to Verify the Chassis” on page 212

Note
Allied Telesis recommends using both methods to confirm the initial operations of the chassis, controller cards, and line cards.

Using the LEDs to Verify the Chassis

After powering on the chassis for the first time and waiting a minimum of three minutes for the line and controller cards to complete the initialization process, check the operational status of the various hardware components by examining the LEDs, as explained in this procedure:

1. Check the LEDs on the power supplies:

   - AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies: The power supplies are operating properly when the AC and DC LEDs are solid green and Fault LEDs are off. If there is a problem with a power supply, refer to "AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies" on page 216 for troubleshooting suggestions.
   - AT-SBxPWRSYS1 DC Power Supply: The power supply is operating properly when the DC IN and DC OUT LEDs are solid green and the Fault LED is off. If there is a problem, refer to "AT-SBxPWRSYS1 DC Power Supply" on page 217 for troubleshooting suggestions.

2. Check the Power LED on the AT-SBxFAN06 module. The module is operating normally when the LED is solid green. If the LED is off, the fan module has a problem or failed. Power off the chassis and contact your Allied Telesis representative for assistance. Do not operate the chassis without a fully operational fan unit.

3. If the chassis has one controller card, check the CFC LED on the card. It should be solid green. If the LED is flashing green, the card is still initializing its AlliedWare Plus Operating System. Wait another minute and check the LED again. If the LED is still flashing green, the card may have encountered a problem that prevents it from completing the initialization process. Power off the chassis and replace the controller card.

   Note
   If all the LEDs on the controller card are off, they may have been turned off. Try pressing the eco-friendly button on the card to turn them on.

4. If the chassis has two controller cards, check the CFC LEDs on both cards. The cards are operating correctly when the LEDs are solid green on one card and solid amber on the other. If both LEDs are flashing green, the controller cards are still completing the initialization process. If the LEDs do not change to solid green and amber after another minute, the cards may have encountered a problem that

prevents them from completing the initialization process. Power off the chassis and replace the cards.

5. To check the status of the Ethernet line cards, inspect the SBx Linecard Status LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) A line card is operating normally when its corresponding LED is solid green. The LED flashes green as the card initializes its management software. If an LED is flashing green after two minutes, the corresponding line card may have a problem and cannot complete the initialization process. For example, the line card in slot 8 of the chassis is operating normally when the SBx Linecard Status, number 8 LED is solid green. For troubleshooting suggestions, refer to “Ethernet Line Cards” on page 219.

6. To check the status of the links of the individual ports on the line cards, inspect the L/A LEDs on the cards. The LEDs should be solid or flashing green on ports that are connected to active network devices. If there is a problem with a link, refer to “Twisted Pair Ports” on page 221 and “Fiber Optic or Twisted Pair Transceivers” on page 225 for troubleshooting suggestions.

7. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the PoE LEDs, shown in Figure 21 on page 45. The LEDs are solid green when ports are delivering power to powered devices on your network. If there is a problem, refer to “Power Over Ethernet” on page 223 for troubleshooting suggestions.

Using Local Management to Verify the Chassis

This section explains how to use the commands in the AlliedWare Plus Operating System on the controller card to confirm the operations of the chassis. The section has the following procedure:

- ❒ “Starting a Local Management Session” on page 212
- ❒ “Entering the AlliedWare Plus Operating System Commands” on page 213

The initial management session of the switch must be a local management session. For instructions on how to configure the chassis for remote management with a Telnet or Secure Shell client, refer to the *Software Reference for SwitchBlade x8100 Series Switches*.

Starting a Local Management Session

To start a local management session, perform the following procedure:

1. Connect the RJ-45 end of the management card included with the AT-SBx81CFC960 Controller Fabric Card to the Console RS-232 port on the front panel of the AT-SBx81CFC960 Controller Card, as shown in Figure 150. If the chassis has two controller cards, you may use the Console RS-232 port on either card to establish a local management session with the chassis.

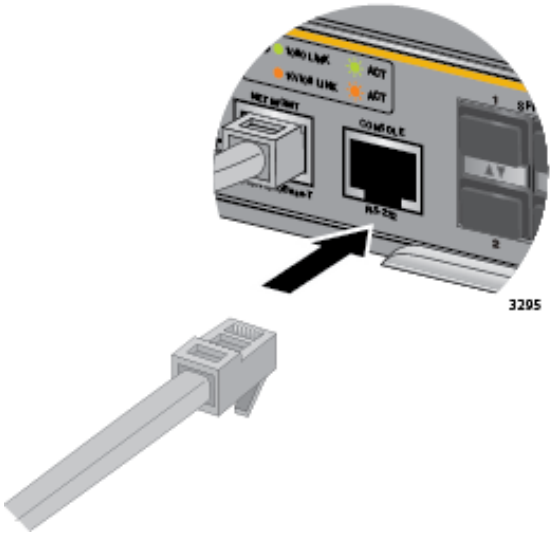


Figure 150. Connecting the Management Cable to the Console RS-232 Port

2. Connect the other end of the cable to an RS-232 port on a terminal or personal computer with a terminal emulation program.

3. Configure the VT-100 terminal or terminal emulation program as follows:

   - ❒ Baud rate: 115,200 bps
   - ❒ Data bits: 8
   - ❒ Parity: None
   - ❒ Stop bits: 1
   - ❒ Flow controller: None

   Note
   The port settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulator program.

4. Press Enter. You are prompted for a user name and password.

5. Enter the default user name and password. They are “manager” and “friend” (without the quotes), respectively

   Note
   User names and passwords are case sensitive.

   The local management session starts and the command line interface (CLI) prompt is displayed.

Entering the AlliedWare Plus Operating System Commands

To confirm the operations of the chassis with the commands in the AlliedWare Plus Operating System, perform the following procedure:

1. Enter the SHOW VERSION command in the User Exec or Privileged Exec mode to display the software version number of the AlliedWare Plus Operating System on the controller card, as shown in Figure 151.

```
awplus# show version

AlliedWare Plus (TM) 5.4.4

Build name : SBx81CFC960-5.4.4.rel
Build date : Wed Dec 15 12:13:19 NZDR 2013
Build type : RELEASE
    NEW-SNMP SNMP agent software
    (c) 1996, 1998-2000 The Regents of the University of California.
        All rights reserved;
.
.
.
```

Software Version Number

Figure 151. SHOW VERSION Command

2. Compare the version number displayed by the SHOW VERSION command with the information in Table 21 on page 78 to confirm that the AlliedWare Plus Operating System on the controller card supports all the hardware components in the chassis. If necessary, update the management software on the controller card.

3. To display the status of the power supplies, fan module, and AT-SBx81CFC960 Controller Fabric Cards, use the SHOW SYSTEM ENVIRONMENT command in the User Exec or Privileged Exec mode. The Status column in the display provides the states of the modules. Components are operating normally when they have an “Ok” status.

4. To display the status of the line cards, use the SHOW CARD command in the Privileged Exec mode A line card has a state of “Online” when it is operating normally. An example of the status information is shown in Figure 152.

```
awplus# show card

Slot    Card Type          State
-----------------------------------------------------
1       AT-SBx81GP24       Online
2       AT-SBx81XS6        Online
3       AT-SBx81GP24       Online
4       AT-SBx81GS24a      Online
5       AT-SBx81CFC960     Online (Active)
6       AT-SBx81CFC960     Online (Standby)
```

Figure 152. SHOW CARD Command

5. To display the states of the individual ports on the Ethernet line cards, use the SHOW INTERFACE STATUS command in the Privileged Exec mode.

6. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the SHOW POWER-INLINE or SHOW POWER-INLINE INTERFACE command in the User Exec or Privileged Exec mode.

   For information about the command line interface, refer to the *Software Reference for SwitchBlade x8100 Series Switches* on the Allied Telesis web site.

Chapter 11
Troubleshooting

This chapter contains information on how to troubleshoot the SwitchBlade x8106 product.

> **Note**
> If you are unable to resolve a hardware problem with the instructions in this chapter, contact Allied Telesis Technical Support for further assistance. Refer to “Contacting Allied Telesis” on page 18 for contact information.

The following troubleshooting information is available:

- “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies” on page 216
- “AT-SBxPWRSYS1 DC Power Supply” on page 217
- “Ethernet Line Cards” on page 219
- “Twisted Pair Ports” on page 221
- “Power Over Ethernet” on page 223
- “Fiber Optic or Twisted Pair Transceivers” on page 225
- “AT-SBx81CFC960 Controller Fabric Card” on page 226
- “AT-SBxFAN06 Fan Module” on page 227
- “Local (Console) Management Session” on page 228
- “Power Supply Interfaces (Opto-couplers)” on page 229

AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies

A power supply is operating normally when its AC and DC LEDs are solid green and the Fault LED is off. Possible fault conditions and their solutions are described here:

Fault Condition 1: If the AC LED is off, the power supply is not receiving power, has overheated and been disabled, or has failed and needs to be replaced. Try the following:

- Verify that there is a power cord connected to the power supply's connector on the back panel of the chassis. For example, if a power supply in slot C does not have power, check for a power cord on connector C on the back panel.
- Verify that the power cord is securely connected to the chassis and the AC power source.
- Verify that the AC power has power by connecting another device to it.
- Verify that the power from the AC power source is within the required levels for your region.
- If the chassis is still operating, use the SHOW PSU or SHOW PSU ALL command from a local or remote management session to determine if the power supply has overheated and shutdown.

Fault Condition 2: If the AC LED is solid green and the DC LED is off, the power unit is generating insufficient DC power. Replace the power supply.

Fault Condition 3: If the Fault LED is solid amber, try the solutions in Fault Condition 1. If they do not resolve the problem, replace the power supply.

Note
The power supplies are hot swappable in a redundant configuration. This allows the AT-SBx8106 Chassis to continue operating while you exchange power supplies.

Fault Condition 4: If the LEDs on the power supply indicate normal operations but the PSU LED on the active master controller card is showing a fault condition, the problem may be with one of the two power supply interfaces (opto-couplers) on the rear panel of the chassis. For troubleshooting suggestions, refer to "Power Supply Interfaces (Opto-couplers)" on page 229.

Caution
The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

AT-SBxPWRSYS1 DC Power Supply

If you suspect a problem with the DC power supply, examine its LEDs. The power supply is operating normally when the DC IN and DC OUT LEDs are solid green and the Fault LED is off. Possible fault conditions and their solutions are described here:

Fault Condition 1: If the DC IN LED is off, the power supply is not receiving power, has overheated and been disabled, or has failed and needs to be replaced. Try the following:

- Verify that the On/Off switch on the power supply is in the On position.
- Verify that the DC circuit breaker is on.
- Verify that the positive and negative power wires are correctly and securely connected to the terminal block on the power supply and circuit breaker.
- Verify that the DC circuit break has power by attaching another device to it.
- Verify that the power from the DC circuit break is within the required levels of the power supply. Refer to “Power Specifications” on page 316.
- If the chassis is still operating, use the SHOW PSU or SHOW PSU ALL command from a local or remote management session to determine if the power supply has overheated and shutdown.

Fault Condition 2: If the DC IN LED is solid green but the DC OUT LED is off, the power unit is generating insufficient DC power. Replace the power supply.

Fault Condition 3: If the Fault LED is solid amber, try the solutions in Fault Condition 1. If they do not resolve the problem, replace the power supply.

Note
The power supply is hot swappable. If the chassis has two power supplies and one of them fails, you do not have to power off the operational power supply to replace the failed unit.

Fault Condition 4: If the LEDs on the power supply indicate normal operations but the PSU LED on the active master control card is off or is showing a fault condition, try the following suggestions:

- The control card may not be able to detect the DC power supply because it is not running the most recent version of the management software. For instructions on how to verify the

software version on the control card, refer to “Using Local Management to Verify the Chassis” on page 212 and “AlliedWare Plus Software Releases for the Hardware Components” on page 78.

- The problem may be with one of the two power supply interfaces (opto-couplers) on the rear panel of the chassis. For troubleshooting suggestions, refer to “Power Supply Interfaces (Opto-couplers)” on page 229.

Caution

The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

Ethernet Line Cards

A quick and easy way to check the overall heath of the Ethernet line cards in the chassis is with the SBx STATUS LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) There are twelve LEDs, numbered 1 to 12. For the AT-SBx8106 Chassis, only LEDs 1 to 6 are used. LEDs 7 to 12 are not used. LED 1 is for slot 1, LED 2 for slot 2, and so on. The cards in the slots are operating normally when the LEDs are green. The Ethernet line card in slot 2 of the chassis, for example, is operating normally when the SBx STATUS LED 2 on the controller card is solid green.

If you suspect a problem with an Ethernet line card or controller card, try the following:

- If all the L/A LEDs on the card are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- Check the card's status LED in the SBx STATUS LEDs on the controller card. If the LED is flashing amber, the card is initializing its management software. Wait one to two minutes for the card to complete the process. If the LED does not change to green, try installing the line card in a different slot. If the problem remains, the card cannot complete the initialization process. Try installing the card in another chassis with a different controller card.
- If the card's status LED in the SBx STATUS LEDs on the controller card is solid amber, the card might not be able to boot up because the controller card does not have its load file and needs to be updated.

Here are some other steps to try:

- Check that the card is completely installed in the slot and that the front plate is flush with the front of the chassis.
- Try resetting the card with the REBOOT CARD command. The example of the command restarts the card in slot 2:

```
awplus# reboot card 2

Reboot card 2 system? (y/n)? y

awplus#
```

- Try installing the card in a different slot. If it works in the new slot, the problem is with the previous slot.
- Try installing the card in a different chassis. If it works in the new chassis, the problem is with the previous chassis. If the problem persists, the problem is with the card.

- Use the SHOW CARD command to display card status information, as shown in Figure 152 on page 214.

If the problem is with an AT-SBx81XS16 Line Card, verify that the chassis has the AT-SBx81CFC960 Controller Fabric Card. The AT-SBx81XS16 Line Card is not compatible with the AT-SBx81CFC400 Controller Fabric Card.

Twisted Pair Ports

This section applies to the twisted pair ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards. To determine whether a twisted pair port on one of the cards has established a link to a network device, examine its L/A LED. The L/A LEDs for the ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards are illustrated in Figure 16 on page 40 and Figure 21 on page 45, respectively. The L/A LEDs for the ports on the AT-SBx81GT40 Line Card are shown in Figure 19 on page 42.

A L/A LED is solid or flashing green when a port is operating at 1000 Mbps and solid or flashing amber at 10 or 100 Mbps.

If a port is cabled to a network device but the L/A LED is off, try the following:

- If all the L/A LEDs on the cards are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- Verify that the network device connected to the port is powered on and operating properly.
- Check that the twisted pair cable is securely connected to the ports on the line card and network device.
- Make sure that the twisted pair cable does not exceed 100 m (328 ft).
- Verify that you are using the appropriate category of cable by referring to Table 12 on page 54 for the AT-SBx81GT24 and AT-SBx81GT40 Line Cards and Table 13 on page 54 for the AT-SBx81GP24 Line Card.
- Verify that the twisted-pair cable is not faulty by replacing it with a known good cable.
- Make sure that the operating parameters of the ports on the line card and network device are compatible.

If the L/A LED for a port is on, signalling a link to the network device, but performance is poor or intermittent, the problem may be from a bad cable. Try replacing the cable.

Another source of poor or intermittent performance on a link can be a speed or duplex mode mismatch between a port and network device. Here are some items to consider when resolving this type of problem:

- The default speed setting for the ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Aut-Negotiation.

- The default speed setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have fixed speeds or 10 or 100 Mbps. For those switch ports, you should disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- The ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. Disable Auto-Negotiation on those ports and set the duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation, which can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

Note
The AT-SBx81GT40 Line Card does not support half-duplex mode.

Yet another source for a poor or intermittent link can be a MDI/MDIX wiring configuration mismatch. The wiring configurations of the ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards are set automatically with automatic MDIX detection when the ports are operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to the ports when they are operating at 1000 Mbps.) You may not disable this feature on the ports. For automatic MDIX detection to work successfully, the network device connected to a port must also support the feature. If it does not, a port on the switch defaults to MDIX. This may require the use of a crossover cable. Here are the guidelines to choosing straight-through or crossover cables for the ports:

- You may use straight-through cables on ports that are connected to network devices that operate at 1000 Mbps.
- You may use straight-through or crossover cables on ports that are connected to network devices that support automatic MDIX detection and that operate at 10 or 100 Mbps.
- You *must* use straight-through cables on ports that are connected to network devices that have a fixed wiring configuration of MDI and that operate at 10 or 100 Mbps.
- You *must* use crossover cables on ports that are connected to network devices that have a fixed wiring configuration of MDIX and that operate at 10 or 100 Mbps.

Power Over Ethernet

This section applies only to the AT-SBx81GP24 Line Card. Each port has two LEDs. The left LED provides port link and activity status and the right LED provides PoE status information. The PoE LED is solid green when a port is delivering power to a powered device (PD). The PoE LED of a port that is not delivering power will be flashing amber, steady amber, or off. If a powered device is not receiving power from a port on the line card, try the following:

- If all the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- Check to be sure that the chassis has at least one AT-SBxPWRPOE1 Power Supply and that the unit is operating properly. The AC and DC LEDs should be solid green and the Fault LED should be off. For troubleshooting suggestions, refer to “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies” on page 216.
- Review the PD’s documentation to confirm that it supports Mode A of the IEEE 802.3at standard. Mode A is one of two modes that define the connector pins that deliver the power from the port on the line card to the PD. In Mode A, the power is carried on pins 1, 2, 3, and 6 on the RJ-45 port, the same pins that carry the network traffic. The second mode, Mode B, defines pins 4, 5, 7, and 8 as the power carriers. The AT-SBx81GP24 Line Card does not support Mode B. Most powered devices are designed to accept power by either mode, but some legacy devices may only support one mode. This can be verified by reviewing the device’s documentation or data sheet. Legacy devices that only support Mode B will not work with this line card.
- Review the device’s documentation or data sheet to confirm that its power requirements do not exceed 30 W.
- Verify that you are using the appropriate category of twisted-pair cable by referring to Table 13 on page 54.
- Try replacing the twisted-pair cable, as explained in “Cabling Guidelines for the Twisted Pair Ports on the AT-SBx81GT24, AT-SBx81GP24, and AT-SBx81GT40 Line Cards” on page 144.
- Use the SHOW POWER-INLINE command in the management software to determine whether PoE is enabled on the port. The default setting for PoE is enabled.
- Use the SHOW POWER-INLINE command to determine whether the PoE power setting for the port has been reduced from the default setting of 30 W, to a value below the power requirements of the device.

- Use the SHOW POE CARD command to determine whether the switch has reach its maximum power budget.
- Try connecting the PD to a port on a different AT-SBx81GP24 Line Card.

Fiber Optic or Twisted Pair Transceivers

The L/A LEDs for the transceiver slots on the AT-SBx81GS24a and AT-SBx81XS6 Line Cards and AT-SBx81CFC960 Controller Fabric Card are solid or flashing green when the ports on the transceivers have links to end nodes. If a transceiver is cabled to an end node but the L/A LED is off, try the following:

- If all the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- Check that the transceiver is firmly inserted into the slot on the line card.
- Check that both ends of the cable are securely connected to the ports on the transceiver and end node.
- Verify that the end node is powered on and operating properly.
- Try replacing the cable.

Here are additional steps for fiber optic transceivers:

- Review the operating specifications of the transceiver and end node to verify that the devices have the same speed and duplex mode.
- Check that the operating specifications, including wavelength and maximum operating distance, of the transceiver are compatible with the fiber optic port on the end node.
- Make sure that you are using the appropriate type of fiber optic cable and that the cable length does not exceed the allowed maximum distance. The cable specifications for the transceivers are provided in the installation instructions that ship with the modules.
- Use a fiber optic tester to test the whether the optical signal is too weak (i.e., sensitivity) or too strong (i.e., maximum input power). The operating specifications of the fiber optic transceivers are shipped with the units.
- Check the two strands of the fiber optic cable to be sure that the receive fiber connector is connected to the transmit connector on the remote end node, and that the transmit fiber connector is connected to the receive connector on the end node.

AT-SBx81CFC960 Controller Fabric Card

If the chassis has one controller card and the card fails, all network operations stop. The Ethernet line cards stop forwarding all network traffic until the controller card is replaced.

If the chassis has two controller cards and one fails, the Ethernet line cards continue to forward traffic, but the bandwidth of the backplane is reduced, which, depending on the number of Ethernet line cards present and the amount of traffic traversing the backplane, may result in slower network operations.

If the chassis has one controller card, examine the M/S LED on the card. The LED should be solid green. If the LED is flashing amber, the card is initializing its management software. Wait one or two minutes for the card to complete the process and check the LED again. If it has not changed to solid green, the card cannot complete the initialization process. Try moving the controller card to the other controller card slot, slot 5 or 6, to see if it works in a different slot. You might also try connecting a terminal or PC with a terminal emulator program to the Console RS232 port to watch for any error messages.

If the chassis has two controller cards, check the M/S LEDs on both cards. The LEDs should be solid green on one card and solid or flashing amber on the other card. If the LEDs are both flashing amber, they are initializing their AlliedWare Plus Operating Software. Wait one or two minutes for the cards to complete the process and check the LEDs again. If both LEDs are still flashing amber, the cards cannot complete the initialization process. Try replacing the cards.

The controller card has an onboard battery to maintain the date and time when the chassis is powered off or reset. If you manually set the date and time but the card loses the information after you power off or reset the unit, you may have forgotten to remove the battery insulator when you installed the card in the chassis. The insulator is shown in Figure 71 on page 132. The only way to remedy the problem is to remove the controller card from the chassis and remove the battery insulator. If the chassis has only one controller card, removing the card causes the Ethernet line cards to stop forwarding traffic.

AT-SBxFAN06 Fan Module

The AT-SBxFAN06 Fan Module is operating correctly when the POWER LED on the module is solid green. If the LED on the fan module is off, check the FAN LED in the SYS STATUS section on the active master controller card. The LED should be green. If the FAN LED is off or flashing amber, one or more fans in the module are no longer operating properly. You may also view the status of the unit with the SHOW FANMODULE command in the management software.

You may notice changes in the fan speeds. This is normal. The active master controller card automatically adjusts the fan speeds according to the internal temperature of the chassis.

Note
The AT-SBxFAN06 Fan Module is hot swappable. You do not have to power off the AT-SBx8106 Chassis to replace the module.

Local (Console) Management Session

If you are unable to establish a local management session with the switch through the Console RS-232 port on the controller card, do the following:

- Check to be sure that the RJ-45 serial management cable is securely connected to the Console RS-232 port on the controller card and the RS-232 port on the terminal or personal computer.
- If the chassis has two controller cards, you should be able to use the Console RS-232 port on either card to establish a local management session with the chassis. If you are unsuccessful establishing a session on one of the controller cards, try connecting to the Console RS-232 port on the other card.
- Check to be sure that the operating parameters on the terminal or the terminal emulation program, if you are using a personal computer, have been set correctly. The default settings for the RJ-45 serial terminal port are located in “Using Local Management to Verify the Chassis” on page 212.
- Check to be sure that the terminal emulator application is compatible with a VT-100 terminal.

Power Supply Interfaces (Opto-couplers)

The two power supply interfaces in the lower right corner of the rear panel are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 13 on page 35.

Each power supply interface supports two power units. The top interface supports the power supplies in slots A and C. The bottom interface supports the supplies in slots B and D.

An interface is operating normally when its Power LED is solid green. The LED of an interface is off if the two corresponding power supply slots are empty or the power supplies are not powered on. For example, the LED for the bottom interface will be off if power supply slots B and D are empty or the power supplies are off.

The network operations of the chassis are not affected If one or both of the interfaces fail. However. the active master controller card changes the PSU LED to flashing amber to signal that it cannot communicate with the power supplies.

Note
The power supply interfaces are *not* hot swappable and can only be serviced by an authorized service technician.

If the Power LED on a power supply interface is off, do the following:

1. Check that there are power supplies in the corresponding slots in the front panel and that the power supplies are powered on. (The Power LED on an interface is off when the slots are empty or the power supplies are not powered on.)

2. Inspect the LEDs on the power supplies to check for a fault condition, If there is a fault condition, go to “AT-SBxPWRSYS1 and AT-SBxPWRPOE1 AC Power Supplies” on page 216 for troubleshooting suggestions. If the LEDs indicate the power supplies are operating normally, go to step 3.

3. Check the PSU LED on the active master controller card. If the LED is solid green, the power supplies and interfaces are operating normally. No corrective steps are required. If the PSU LED is solid amber but the LEDs on the power supplies indicate normal operations, there may be a problem with a power supply interface. Contact your Allied Telesis sales representative for assistance.

Chapter 12

Replacing Modules

This chapter contains procedures on how to replace modules in the unit. The chapter contains the following sections:

- “Replacing AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 Power Supplies” on page 232
- “Replacing the AT-SBxPWRSYS1 DC Power Supply” on page 237
- “Replacing Ethernet Line Cards” on page 248
- “Replacing the AT-SBx81CFC960 Controller Fabric Card” on page 250
- “Replacing the AT-SBxFAN06 Fan Module” on page 253

Replacing AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 Power Supplies

This section contains the procedure for removing AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 Power Supplies from the AT-SBx8106 Chassis.

Note
The illustrations in the following procedure show the removal of an AT-SBxPWRSYS1 AC Power Supply from slot D. The procedure is the same for all power supply slots.

To remove an AT-SBxPWRSYS1 AC or AT-SBxPWRPOE1 Power Supply from the chassis, perform the following procedure:

1. Disconnect the AC power cord for the power supply from the AC power source and the corresponding AC socket on the back panel of the chassis. The figure in Figure 153 shows the removal of the power cord from connector D, which corresponds to slot D on the front panel.

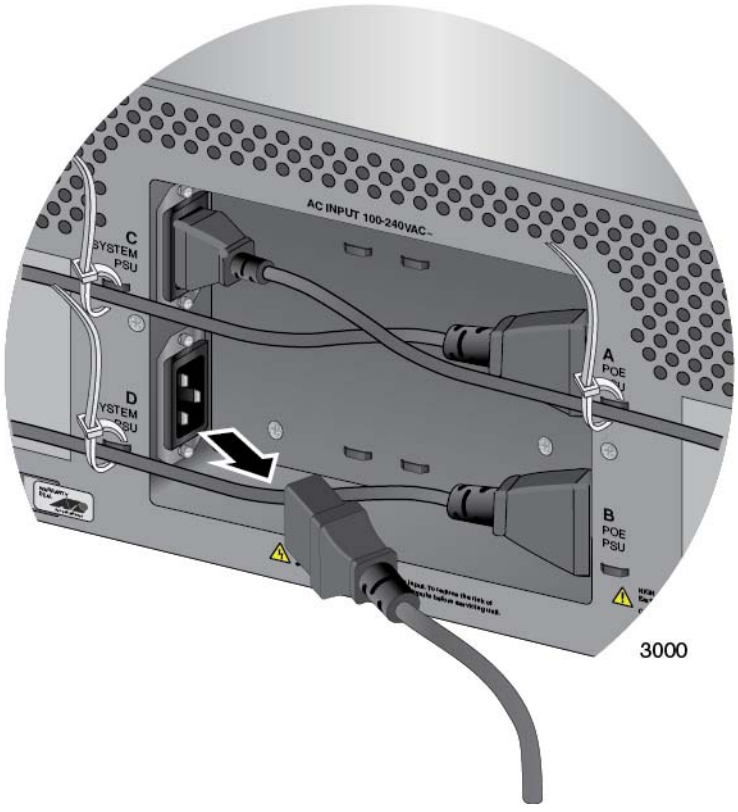


Figure 153. Disconnecting the AC Power Cord from the AC Socket on the Back Panel

2. Lift the locking hand on the power supply. Refer to Figure 154.

Figure 154. Lifting the Locking Handle on the Power Supply

3. Carefully pull on the locking handle to slide the power supply from the chassis. Refer to Figure 155 on page 234.

Warning
The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.

Figure 155. Removing the Power Supply from the Chassis

4. Do one of the following:

   - ❒ To install a new power supply, refer to Chapter 6, “Installing the Power Supplies” on page 107.
   - ❒ If you are not installing a new power supply, continue with the rest of this procedure to install a blank slot cover.

5. Place the locking handle on the slot cover in the up position and slide the cover into the empty power supply slot. Refer to Figure 156 on page 235.

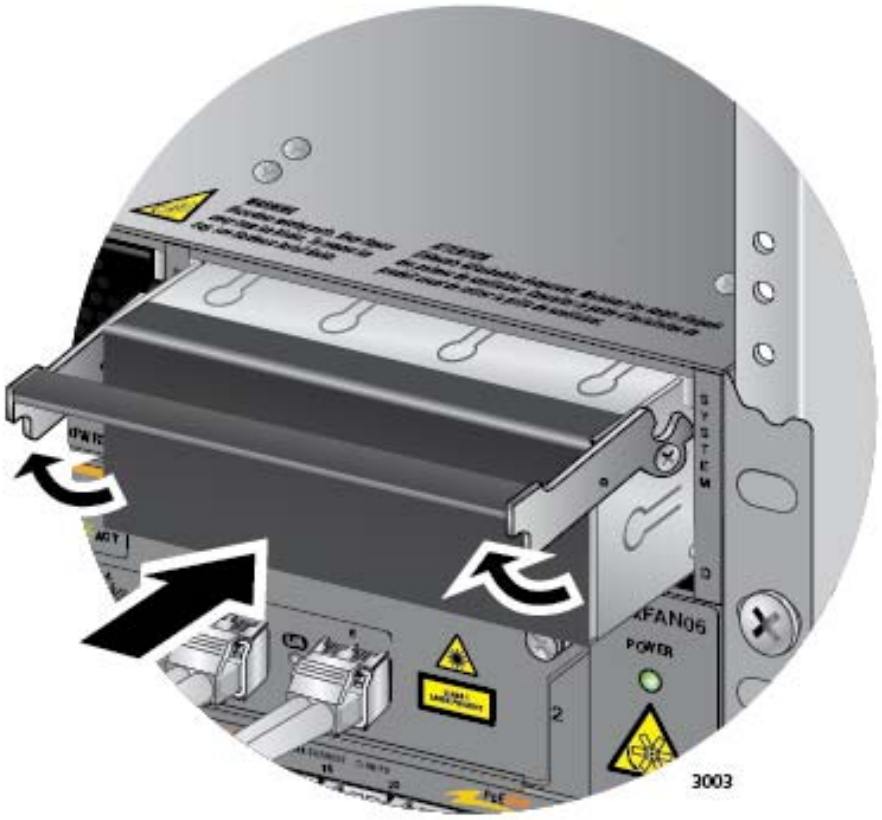


Figure 156. Installing a Blank Power Supply Slot Cover

6. Lower the locking handle to secure the slot cover in the slot. Refer to Figure 157 on page 236.

Figure 157. Lowering the Locking Handle on the Power Supply Slot Cover

Replacing the AT-SBxPWRSYS1 DC Power Supply

To remove an AT-SBxPWRSYS1 DC Power Supply from the chassis, perform the following procedure:

1. Turn off the circuit breaker to the AT-SBxPWRSYS1 DC Power Supply.
2. Turn off the On/Off switch on the front panel of the power supply. Refer to Figure 119 on page 180.
3. Use a #2 screwdriver to loosen the screw on the locking handle. Refer to Figure 158.

Note
Do not lift the locking handle yet.

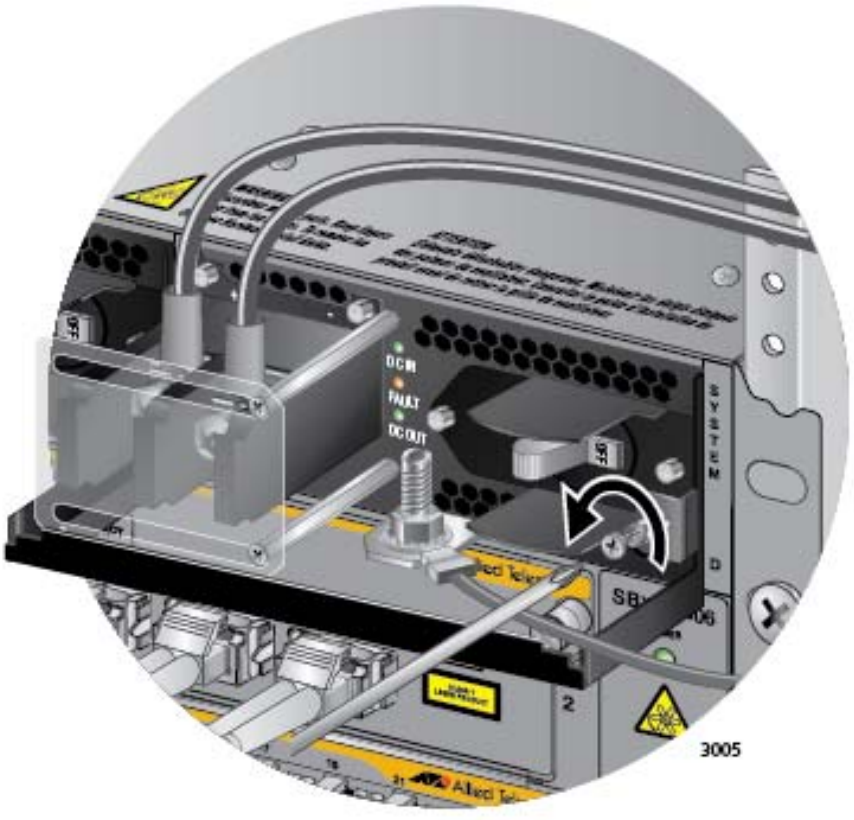


Figure 158. Loosening the Screw on the Locking Handle

Note
If the power wires are connected to the terminal block with the right angle terminals, go to step 5.

4. Use a #1 screwdriver to loosen the two screws that secure the plastic cover over the terminal block and slide the cover to the right. You may need to slightly lift the locking handle to access the bottom screw. Refer to Figure 159.

   The plastic cover may not be present if the lead wires are connected to the terminal block with the right angle terminals. If this is the case, you may skip this step.

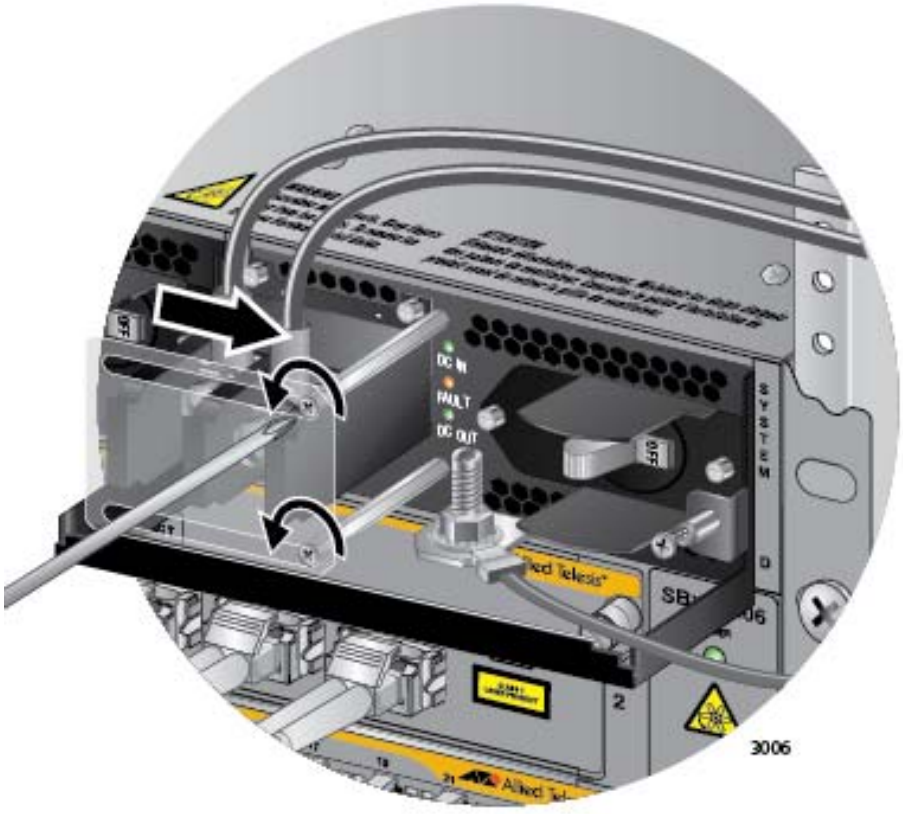


Figure 159. Opening the Plastic Window on the Terminal Block

5. Use a #3 screwdriver to remove the negative (-) lead wire from the terminal block. The negative lead wire is on the right. Refer to Figure 160 on page 239.

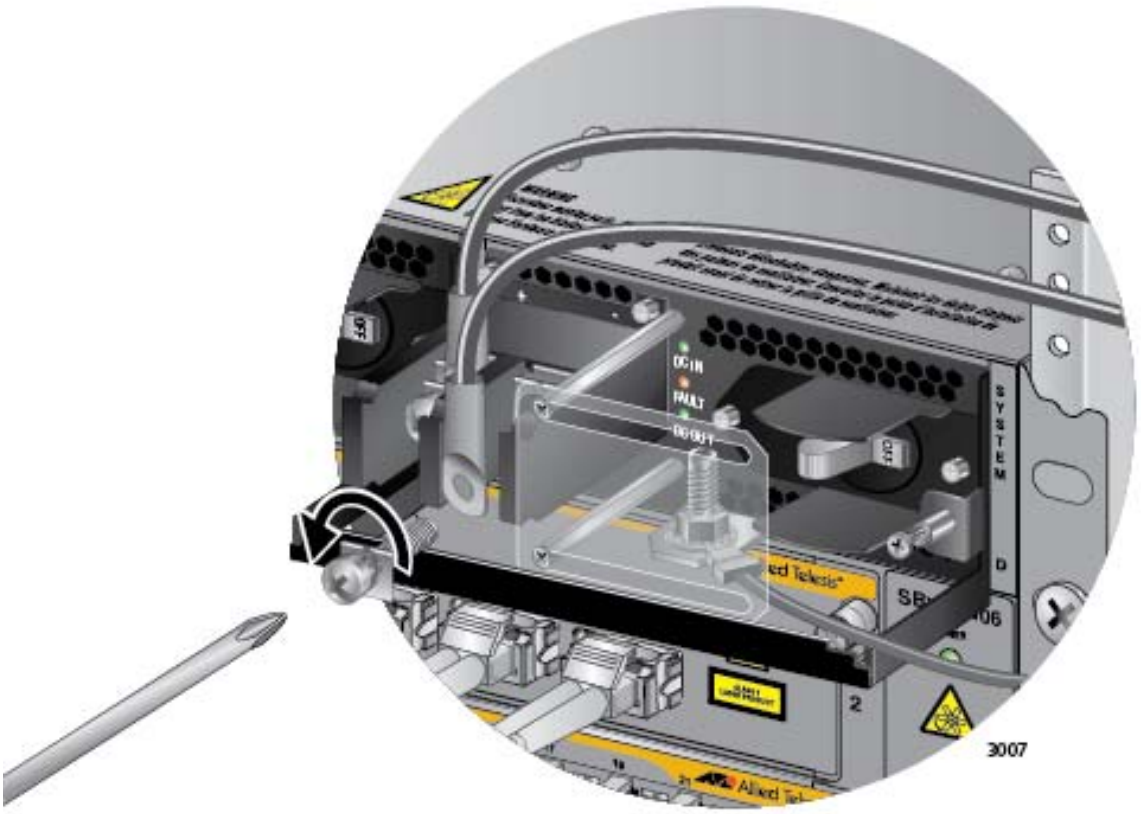


Figure 160. Removing the Negative Lead Wire

6. Use a #3 screwdriver to remove the positive (+) lead wire from the terminal block. Refer to Figure 161 on page 240.

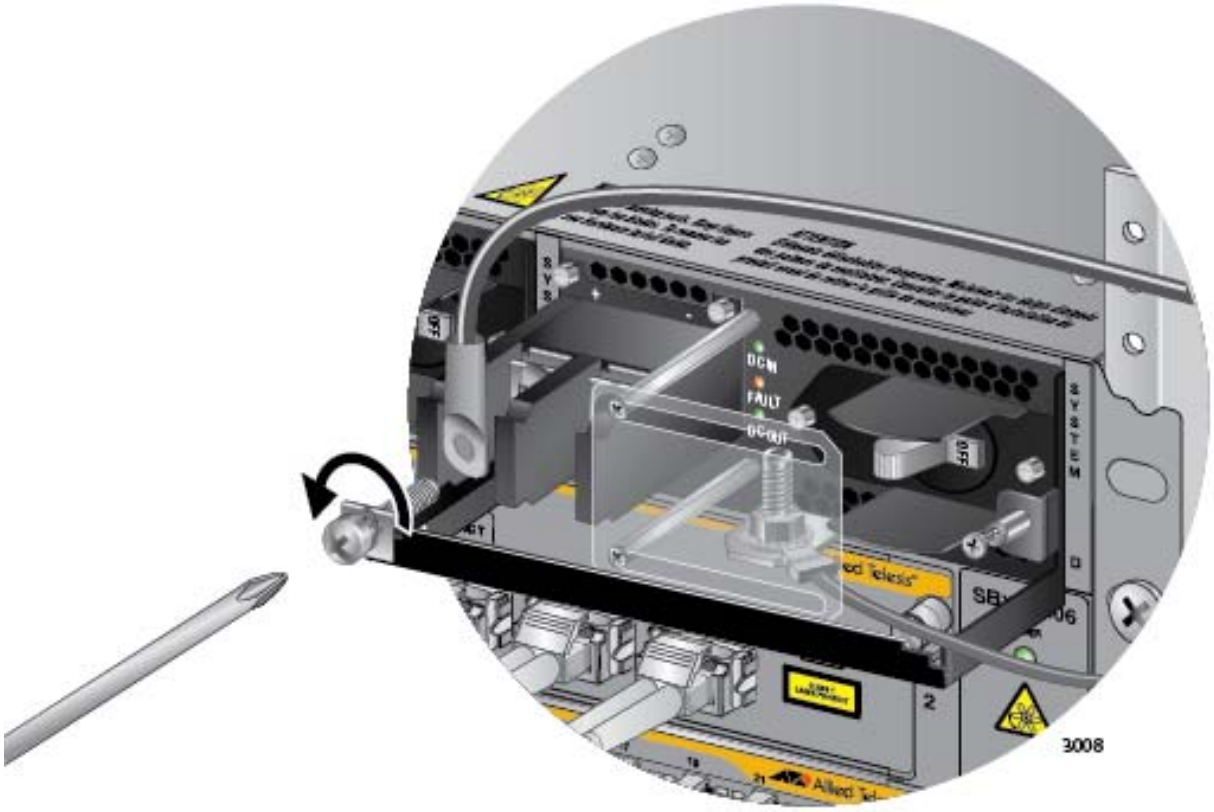


Figure 161. Removing the Positive Lead Wire from the Terminal Block

7. Reinstall the two screws on the negative (-) and positive (+) terminals. Refer to Figure 162 on page 241.

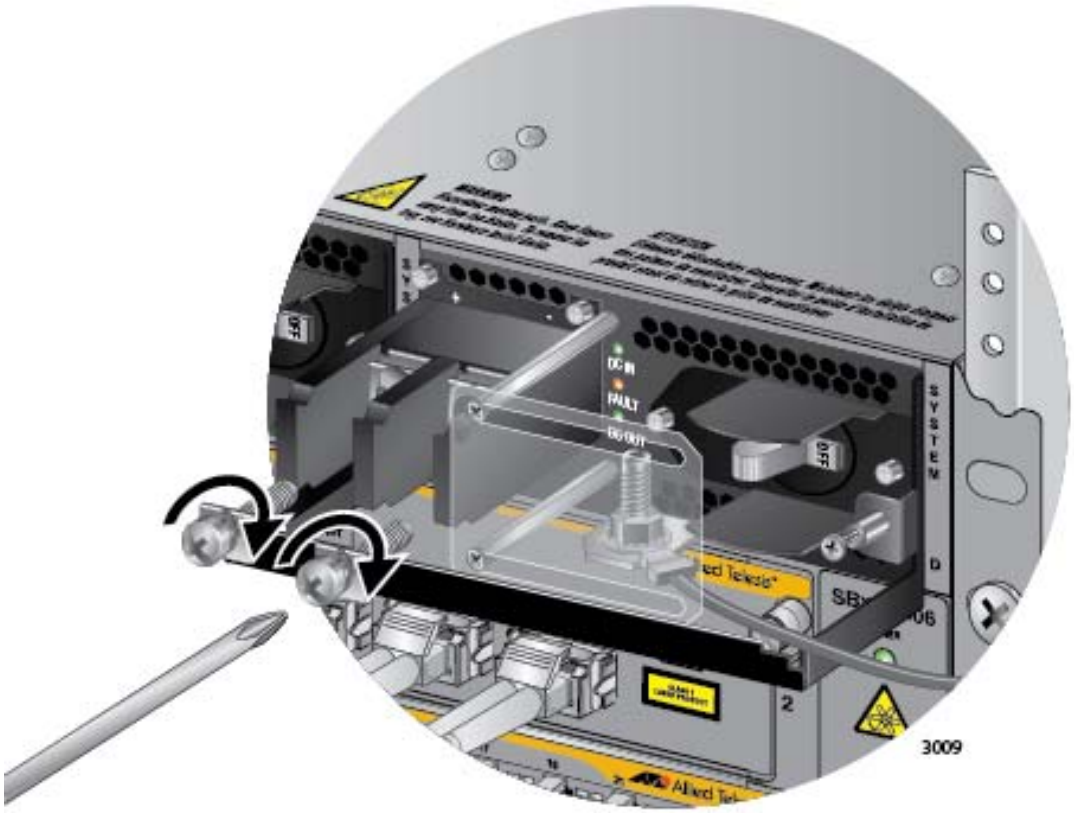


Figure 162. Reinstalling the Screws on the Positive and Negative Terminals

8. Slide the plastic cover to the left and lightly tighten the two screws to secure it in place. Refer to Figure 163 on page 242.

Caution
Do not over tighten the screws or you may crack or break the plastic cover.

The plastic cover may not be present if the lead wires were connected to the terminal block with the right angle terminals. If this is the case, you may either skip this step or reinstall the plastic cover on the power supply.

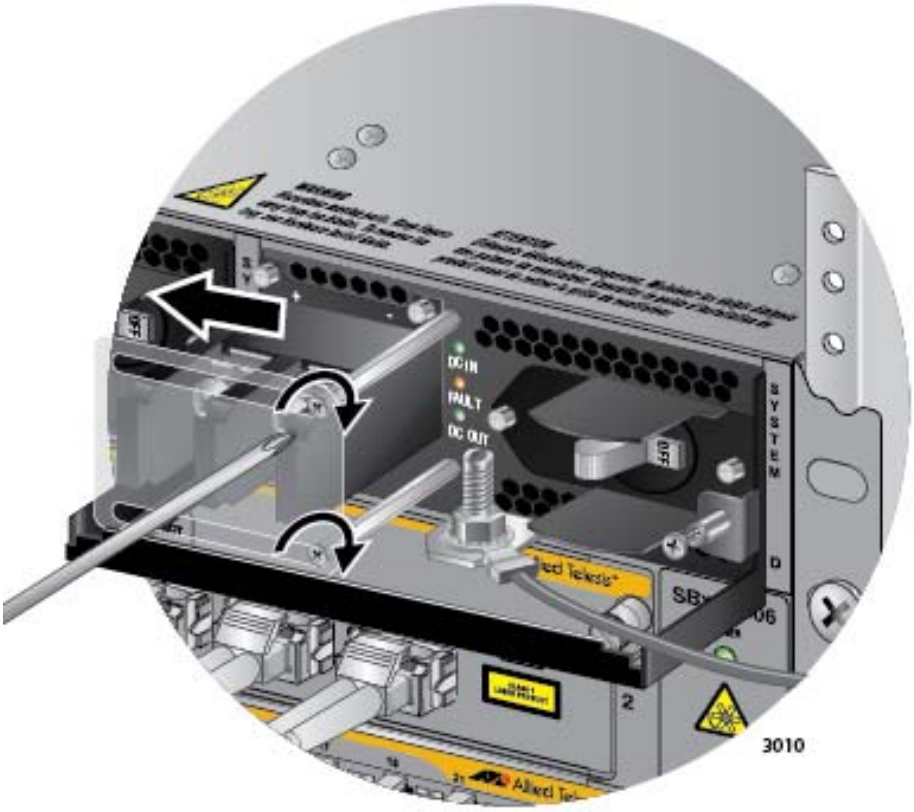


Figure 163. Closing the Plastic Cover

9. Use an 8 mm wrench to remove the grounding wire from the grounding post. Refer to Figure 164 on page 243.

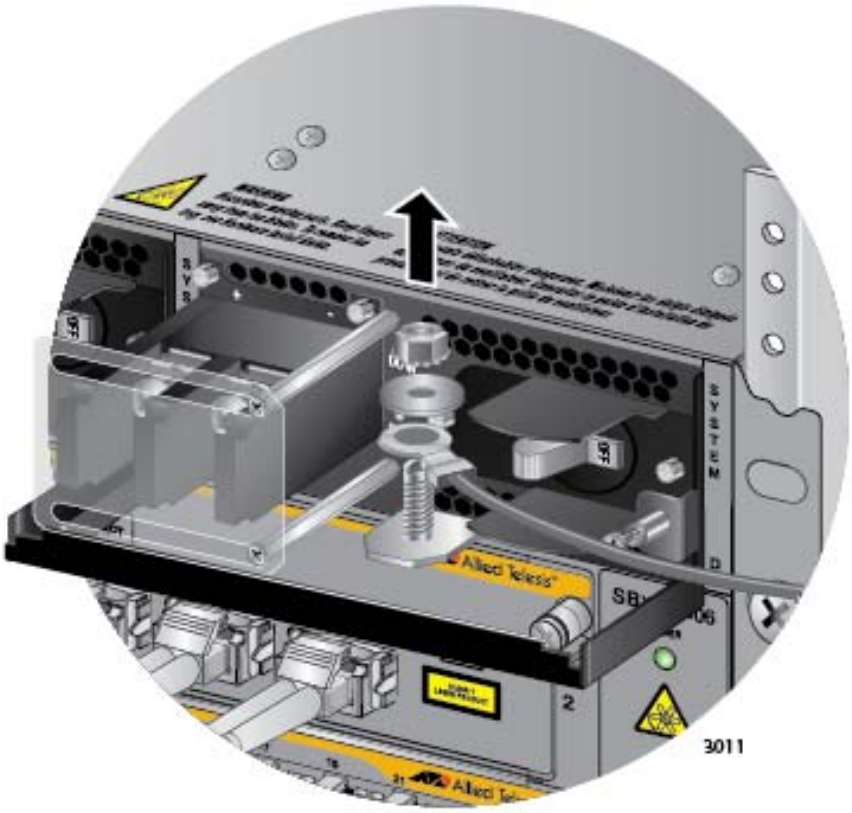


Figure 164. Removing the Grounding Wire

10. Reinstall the nut and washer on the grounding post. Refer to Figure 165 on page 244.

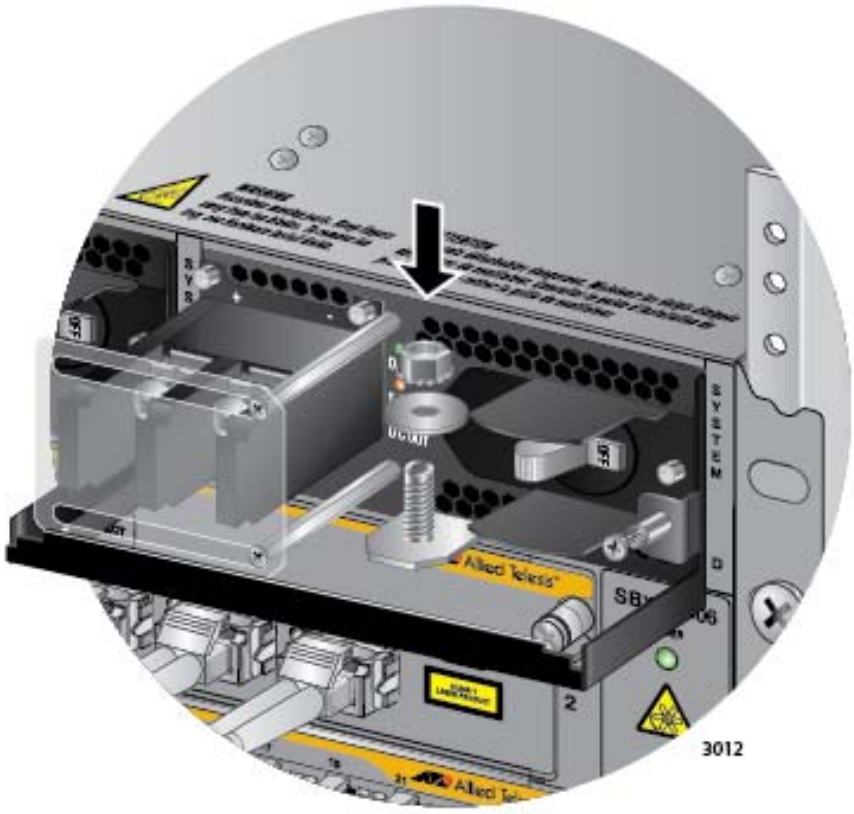


Figure 165. Reinstalling the Nut and Washer on the Grounding Post

11. Lift the locking handle and slide the power supply from the chassis. Refer to Figure 166 on page 245.

Warning
The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.

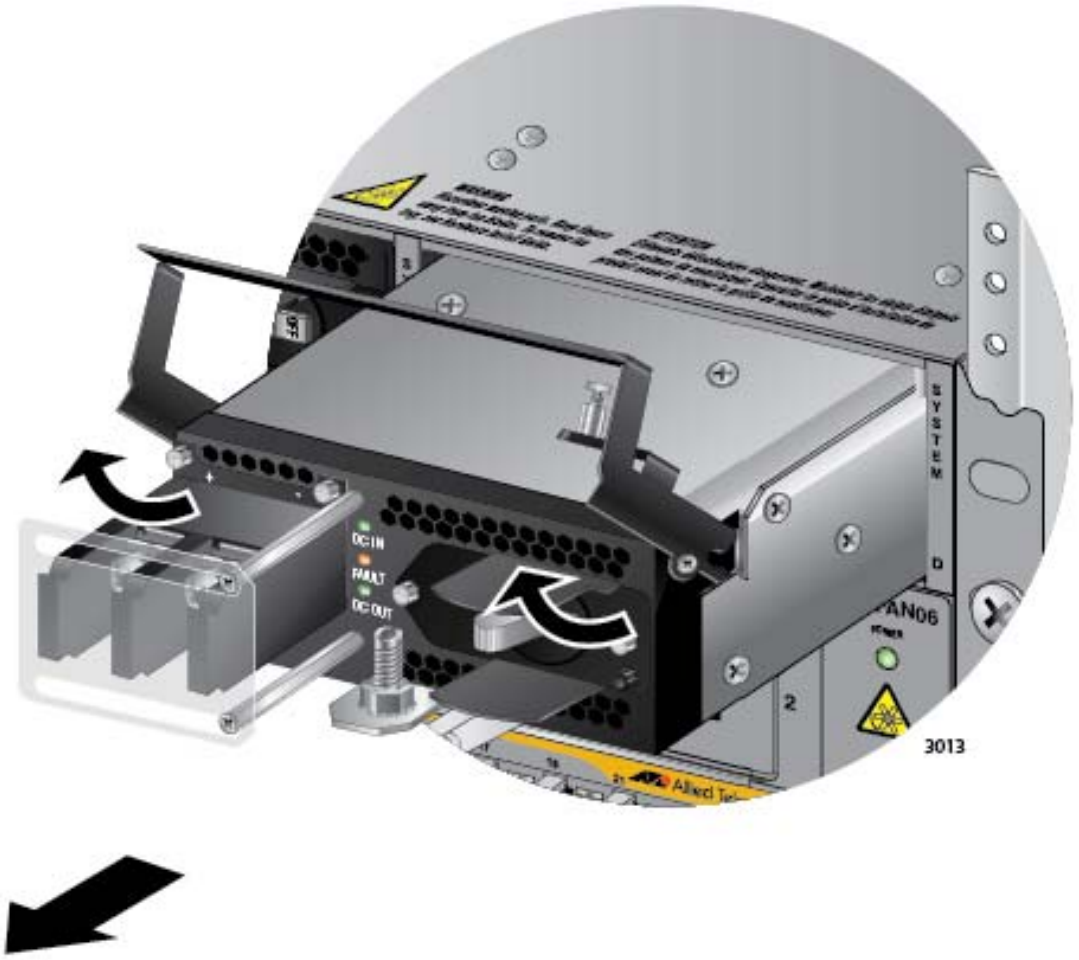


Figure 166. Lifting the Locking Handle and Removing the Power Supply

12. Do one of the following:

    - To install a new power supply, refer to Chapter 6, “Installing the Power Supplies” on page 107.
    - If you are not installing a new power supply, continue with this procedure to install a blank slot cover.

13. Place the locking handle on the slot cover in the up position and slide the cover into the empty power supply slot. Refer to Figure 167 on page 246.

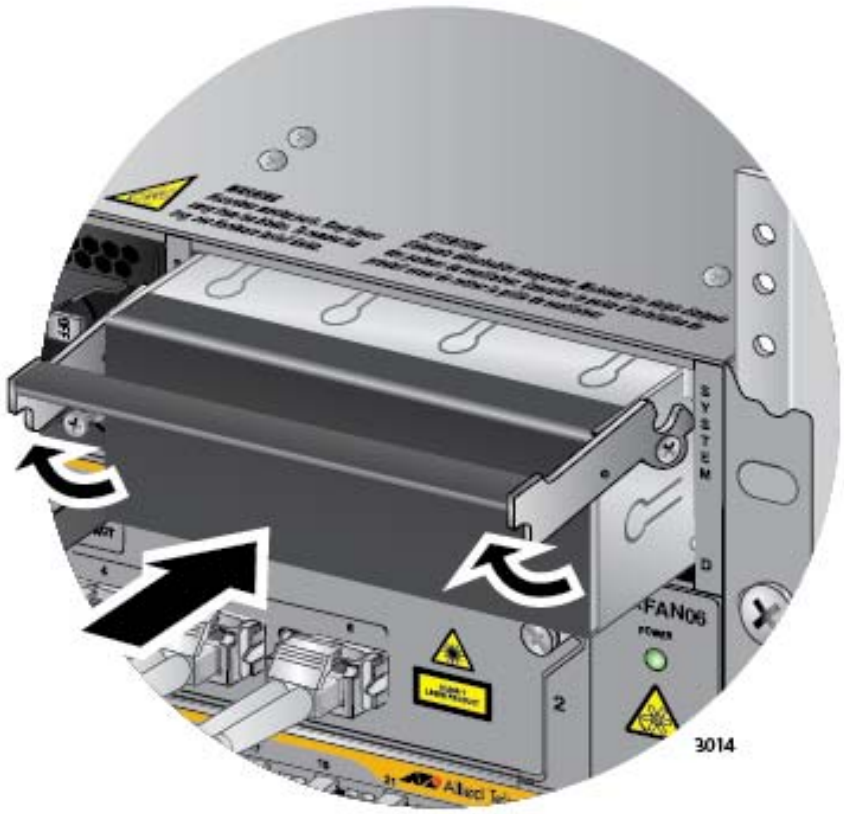


Figure 167. Installing a Blank Power Supply Slot Cover

14. Lower the locking handle to secure the slot cover to the slot. Refer to Figure 168 on page 247.

Figure 168. Lowering the Locking Handle on the Power Supply Slot Cover

Replacing Ethernet Line Cards

This section contains the procedure for replacing Ethernet line cards in the chassis.

Note
Please review “Guidelines to Handling the Controller and Line Cards” on page 128 before performing this procedure.

This procedure requires the following tool:

- ❒ #2 Phillips-head screwdriver (not provided)

The Ethernet line cards are hot swappable and can be removed while the chassis is powered on.

To remove an Ethernet line card from the chassis, perform the following procedure:

1. Label and remove the cables from the Ethernet line card.
2. If the line card has fiber optic transceivers, install dust covers on the ports.
3. If the line card has transceivers, label and remove the transceivers.
4. Use a #2 Phillips-head screwdriver to loosen the two screws on the faceplate of the card.
5. Carefully pull on the screws to disconnect the line card from the connector on the backplane.
6. Carefully slide the card from the chassis.

Caution
Keep the card level as you slide it out of the chassis. You might damage the components on the top or bottom of the card if you slide it out at an angle. Refer to Figure 67 on page 129.

7. Do one of the following:
   - ❒ For instructions on how to install the line card in another slot of the chassis or a different chassis, refer to “Installing the Ethernet Line Cards” on page 136.
   - ❒ If you do not plan to immediately install another line card in the same slot, you should cover the slot with a blank cover. For

instructions, refer to “Installing the Blank Slot Covers” on page 140.

- ❒ If you do not plan to immediately install the card in another chassis, continue with this procedure.

8. Store the line card in an anti-static bag.
9. Return the line card to its shipping container.

Replacing the AT-SBx81CFC960 Controller Fabric Card

This section contains the procedure for replacing a controller card in the chassis.

> **Note**
> Please review “Guidelines to Handling the Controller and Line Cards” on page 128 before performing this procedure.

This procedure requires the following tool:

- ❒ #2 Phillips-head screwdriver (not provided)

The controller card is hot swappable and can be removed while the chassis is powered on.

Here are the general steps if the chassis has only one controller card and that card has failed such that it is no longer responding to management commands and the Ethernet line cards have stopped forwarding traffic:

1. Power off the chassis.
2. Remove the failed controller card. Refer to the instructions in this section.
3. Install the new controller card. You may install the new controller card in the same slot as the failed card or in the other controller card slot. For instructions, refer to “Installing the AT-SBx81CFC960 Controller Fabric Card” on page 130.
4. Power on the chassis.
5. Restore the configuration to the Ethernet line and controller cards by uploading the latest archived copy of the configuration file for the chassis to the new controller card. If you do not have an archived copy of the configuration settings of the chassis, restore the configuration manually.

Here are the general steps If the chassis has two controller cards and one cards has failed:

1. If the chassis is powered off, power it on.

Note
You should not replace a controller card in a chassis that has two controller cards while the unit is powered off, especially if you are replacing a failed controller card in slot 5. If you replace a failed controller card while the chassis is powered off, the Ethernet line cards might lose their configurations if the new controller card is designated as the active card when you power on the chassis.

2. Remove the failed controller card. Refer to the instructions in this section.

3. Install the new controller card. For instructions, refer to “Installing the AT-SBx81CFC960 Controller Fabric Card” on page 130.

To remove a controller card from the chassis, perform the following procedure:

1. Disconnect the cables from the NET MGMT and Console ports on the controller card.

2. Remove any SFP+ or stacking transceivers from the SFP+ slots on the controller card.

3. Use a #2 Phillips-head screwdriver to loosen the two screws on the faceplate of the card.

4. Carefully pull out the handles of the faceplate to disconnect the controller card from the connector on the backplane of the chassis.

5. Carefully slide the controller card from the chassis.

Caution
Keep the card level as you slide it out of the chassis. You might damage the components on the top or bottom of the card if you slide it out at an angle. Refer to Figure 67 on page 129.

6. Do one of the following:

   - For instructions on how to install a new controller card in the chassis, refer to “Installing the AT-SBx81CFC960 Controller Fabric Card” on page 130.
   - If you do not plan to immediately install another controller card in the slot, cover the slot with a blank cover. For instructions, refer to “Installing the Blank Slot Covers” on page 140.
   - If you do not plan to immediately install the controller card in another chassis, continue with this procedure.

7. Store the controller card in an anti-static bag.
8. Return the card to its shipping container.

Replacing the AT-SBxFAN06 Fan Module

This section contains the procedures for replacing the AT-SBxFAN06 Fan Module. The module is located in the slot on the right side of the front panel.

Caution
Although the fan module is hot swappable and can be replaced while the chassis is powered on, the line cards and power supplies may overheat if the chassis is operated for more than one or two minutes without a fan module.

Warning
The fan module has hazardous moving parts. Keep fingers away from moving fan blades.

Note
Only an authorized service technician should replace the fan module.

Removing the AT-SBxFAN06 Fan Module

To remove the fan module from the chassis, perform the following procedure:

1. If necessary, disconnect or reroute network cables that are blocking access to the fan module.
2. Use a #2 Phillips head screwdriver to loosen the screw at the base of the fan module. Refer to Figure 169 on page 254.

Figure 169. Loosening the Screw on the AT-SBxFAN06 Fan Module

3. Carefully pull on the handle to disconnect the fan module from the connector on the backplane of the chassis. Refer to Figure 170.

Figure 170. Loosening the AT-SBxFAN06 Fan Module from the Backplane Connector

4. Slowly pull the module out 25 mm (1 in.). Refer to Figure 171.

Figure 171. Withdrawing the AT-SBxFAN06 Fan Module 25 mm (1 in.) from the Chassis

5. Wait ten seconds for the fans to stop.

Warning
The fan module has hazardous moving parts. Keep fingers away from moving fan blades.

6. After the fans have stopped, slide the module from the chassis. Refer to Figure 172 on page 256.

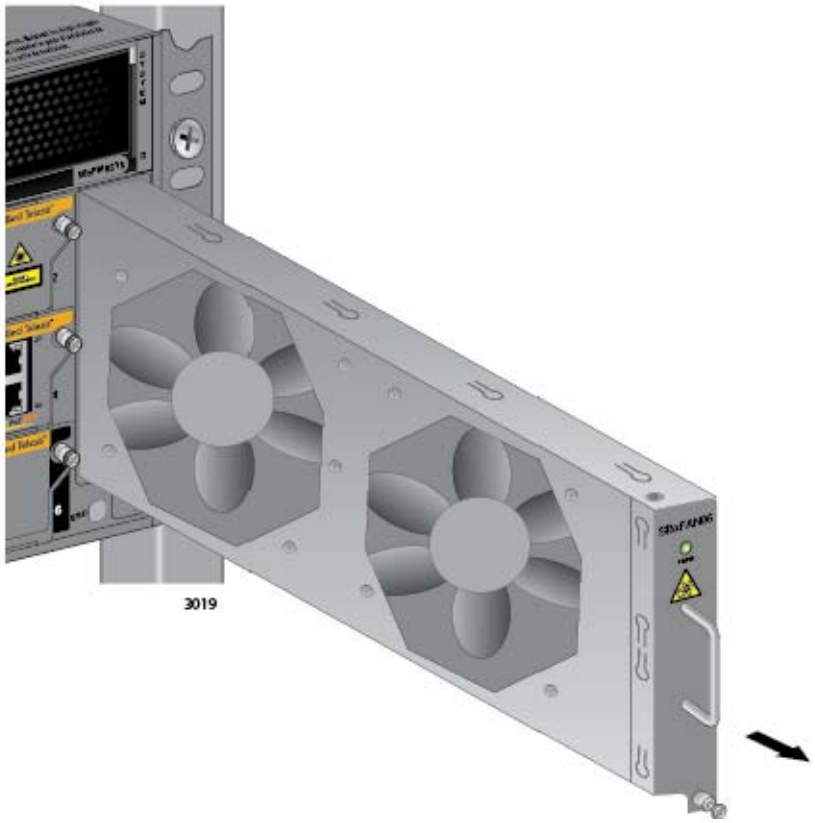


Figure 172. Removing the AT-SBxFAN06 Fan Module from the Chassis

Installing a New AT-SBxFAN06 Fan Module

This procedure assumes that you have already removed the old fan module from the chassis and are continuing directly from the previous procedure, “Removing the AT-SBxFAN06 Fan Module” on page 253. To install the new fan module, perform the following procedure

1. Orient the new module with the LED and module name on top and carefully slide the module into the slot in the chassis. Refer to Figure 173 on page 257.

Figure 173. Installing a New AT-SBxFAN06 Fan Module

2. When you feel the fan module make contact with the connector on the backplane, gently push on the top and bottom of the faceplate to seat the module on the connector. Refer to Figure 174 on page 258.

Figure 174. Securing the AT-SBxFAN06 Fan Module on the Backplane Connector

3. With a #2 Phillips-head screwdriver, tighten the screw at the base of the module to secure the module to the chassis. Refer to Figure 175.

Figure 175. Tightening the Screw on the AT-SBxFAN06 Fan Module

4. Reconnect any network cables you may have disconnected to access the fan module.

Chapter 13

Upgrading the Controller Fabric Card

This chapter contains the procedure for upgrading the AT-SBx8106 Chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card. The chapter contains the following sections:

- “Before You Begin” on page 260
- “Upgrading the Controller Fabric Card” on page 262

Before You Begin

The instructions in this chapter explain how to update a chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card. Here are the basic steps to the procedure:

1. Download the configuration file on the AT-SBx81CFC400 Controller Fabric Card to a flash drive with the COPY command in the Privileged Exec mode of the command line interface.
2. Power off the chassis.
3. Remove the AT-SBx81CFC400 Controller Fabric Cards from the chassis.
4. Install the new AT-SBx81CFC960 Cards in the chassis.

Note
Do not operate the chassis with both AT-SBx81CFC400 and AT-SBx81CFC960 Controller Fabric Cards. The controller cards are not compatible.

5. Power on the chassis.
6. Upload the configuration file from the flash drive to the AT-SBx81CFC960 Controller Fabric Card with the COPY command.
7. Designate the configuration file as the active configuration file for the controller card with the BOOT CONFIG-FILE command in the Global Configuration mode.
8. Reboot the chassis with the REBOOT command in the Privileged Exec mode.
9. Use the appropriate SHOW commands to confirm the configuration settings of the Ethernet line cards.
10. Install optional feature licenses.

For step-by-step instructions. refer to “Upgrading the Controller Fabric Card” on page 262.

Please review the following information before performing the upgrade procedure:

- The premium and AMF master feature licenses for the AT-SBx81CFC400 Controller Fabric Card are not compatible with the AT-SBx81CFC960 Card. Consequently, if the AT-SBx81CFC400

Card in the chassis has a feature license, you must order a new license from Allied Telesis for the AT-SBx81CFC960 Card and install it after installing the new controller card.

- The command formats are presented in abbreviated versions to simplify the procedure. To learn the complete formats of the commands, refer to the Software Reference for SwitchBlade x8100 Series Switches.
- The procedure requires a flash drive to temporarily store the configuration file from the old controller card prior to transferring it to the new card. If you prefer to store the file on a different network device, such as a TFTP server, refer to the description of the COPY command in the Software Reference for SwitchBlade x8100 Series Switches for directions.
- This procedure assumes that the configuration file for the chassis is stored in the root directory of flash memory on the AT-SBx81CFC400 Controller Fabric Card. If the file is stored in a subdirectory or on another network device, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions.
- The procedure stores the configuration file in the root directory of flash memory of the AT-SBx81CFC960 Controller Fabric Card. If you prefer to store the file in a subdirectory of flash memory or on a different network device, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions.

Upgrading the Controller Fabric Card

This section contains step-by-step instructions on how to upgrade the chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card.

Caution
This procedure is disruptive to network operations because it requires powering off the chassis. It should be performed during periods of low network activity, such as during non-business hours, to minimize the disruption to your network users.

To upgrade the chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card, perform the following procedure:

1. Start a local or remote management session with the active AT-SBx81CFC400 Card in the chassis.

2. Insert a flash drive into the USB port on the AT-SBx81CFC400 Card in the chassis. If the chassis has two controller cards, use the USB port on the active master controller. To determine the status of the controller cards, examine the CFC LEDs. The LEDs are solid green on the active master card and solid amber on the inactive master card.

3. Wait ten seconds for the controller card to mount the flash drive.

4. Move from the User Exec mode to the Privileged Exec mode with the ENABLE command:

```
awplus> enable
awplus#
```

5. Use the COPY command in the Privileged Exec mode to copy the running configuration of the controller card to the flash drive.

   The format of the COPY command for copying files to a flash drive is shown here:

```
copy running-config usb:/filename>
```

   The filename parameter specifies a filename for the configuration file. The filename must include the ".cfg" suffix.

   This example of the command stores the configuration file in the root directory of the flash drive and names it "Engineering_1.cfg".

```
awplus# copy running-config usb:/Enginnering_1.cfg
```

6. Remove the flash drive from the controller card.

7. Power off the chassis.

8. Remove the AT-SBx81CFC400 Controller Fabric Card from the unit. If the unit has two controller cards, remove both cards.

9. Install the new AT-SBx81CFC960 Card. If there are two cards, install both cards. For instructions, refer to “Installing the AT-SBx81CFC960 Controller Fabric Card” on page 130.

   Note
   Do not operate the chassis with both AT-SBx81CFC400 and AT-SBx81CFC960 Controller Fabric Cards. The controller cards are not compatible.

10. Power on the chassis. For instructions, refer to Chapter 9, “Powering On the Chassis” on page 171.

11. Verify the hardware operations of the chassis with the new controller card by performing the instructions in Chapter 10, “Verifying the Hardware Operations of the Chassis” on page 209.

12. Start a local or remote management session with the active master controller card in the chassis.

13. Insert the flash drive into the USB port on the controller card. If the chassis has two controller cards, be sure to use the USB port on the active master controller card. The CFC LEDs are solid green on the active card and solid amber on the inactive card.

14. Wait ten seconds for the controller card to mount the flash drive.

15. Move from the User Exec mode to the Privileged Exec mode with the ENABLE command:

```
awplus> enable
awplus#
```

16. Copy the configuration file from the flash drive to the new controller card with the COPY command.

    The format of the command is shown here:

```
copy usb:/<source_filename> <destination_filename>
```

    The source_filename parameter specifies the name of the configuration file stored on the flash drive on the USB port. If you have forgotten the filename, use the DIR command to display it. The destination_filename parameter specifies the name to be assigned to the configuration file when it is stored in the flash memory of the

controller card. The name can be the same as or different from the source filename. The filename must include the suffix ".cfg".

This example of the command copies the Enginerring_sw1.cfg configuration file from flash drive to the controller card:

```
copy usb:/Engineering_sw1.cfg Engineering_sw1.cfg
```

This example of the command copies the switch2a_rm12.cfg configuration file from flash drive to the controller card, and renames it Sales4_rm12.cfg:

```
copy usb:/switch2a_rm12.cfg Sales4_rm12.cfg
```

17. Move to the Global Configuration mode with the CONFIGURE TERMINAL command:

```
awplus# configure terminal
awplus(config)#
```

18. Designate the file as the boot configuration for the chassis with the BOOT CONFIG-FILE command in the Global Configuration mode.

    The format of the command is given here:

```
boot config-file flash:/filename
```

    This example of the command designates the configuration file Engineering_sw1.cfg as the boot configuration file for the chassis.

```
boot config-file flash:/Enginerring_sw1.cfg
```

19. Enter the EXIT command to return to the Privileged Exec mode.

```
awplus(config)# exit
awplus#
```

20. Enter the REBOOT command in the Privileged Exec mode to reboot the chassis.

```
awplus# reboot
```

21. Enter Y for yes at the confirmation prompt.

22. Wait three minutes for the controller and Ethernet line cards to initialize the management software.

23. Start a new management session and use the appropriate SHOW commands to confirm the configurations of the components and features of the chassis.

24. To install optional feature licenses, use the LICENSE command in the Privileged Exec mode of the command line interface. For instructions,

refer to the Software Reference for SwitchBlade x8100 Series Switches.

Section III

Building a Stack with VCStack Plus

This section contains the following chapters:

- Chapter 14, “VCStack Plus Overview” on page 269
- Chapter 15, “Building a Stack” on page 283

Chapter 14

VCStack Plus Overview

This chapter contains a brief overview of the VCStack Plus feature. For more information, refer to the Software Reference for SwitchBlade x8100 Series Switches. The chapter contains the following sections:

- “Overview” on page 270
- “Stack Trunk and Stacking Transceivers” on page 271
- “Cabling Configurations for the Stacking Transceivers” on page 273
- “VCStack Plus Feature License” on page 276
- “Optional Feature Licenses” on page 277
- “Chassis ID Numbers” on page 278
- “Priority Numbers” on page 279
- “Stacking Guidelines” on page 281

Overview

The VCStack Plus feature is an optional feature for the AT-SBx8106 Chassis. The feature is used to connect two chassis together so that the devices function as a single networking unit. This is referred to as a virtual switch. The benefits of the feature are mentioned here:

- Simplifies management - The two switches of the stack are managed as a single unit, rather than individually. Local and remote management sessions automatically provide management access to both chassis.
- Reduces IP addresses - The stack requires only one IP address for remote management access, thereby reducing the number of IP addresses in the network.
- Adds feature flexibility and resiliency - The stack adds flexibility to some features. For instance, a port aggregator can consist of ports from both switches in the stack. This increases the resiliency of the aggregator because it can continue to function if one of the switches stops functioning, though at a reduced bandwidth.
- Reduces protocol requirements - Creating a stack might eliminate the need for some protocols in your network, such as the Virtual Router Redundancy Protocol and Spanning Tree Protocol.

Stack Trunk and Stacking Transceivers

The two chassis of the stack are connected with the stack trunk. The trunk consists of the following components:

- The four SFP+ slots on the front panel of the AT-SBx81CFC960 Controller Fabric Card.
- AT-Stack stacking transceivers from Allied Telesis and fiber optic cables.

The trunk of the stack can have either four or eight links. The number of links depends on the number of AT-SBx81CFC960 Controller Fabric Cards in the switches. Given that the controller card has four SFP+ slots, the trunk can have four links if both switches have only one controller card and eight links if both switches have two controller cards.

The stack uses all the links in the trunk to actively forward traffic between the switches. The bandwidth of the trunk is 40Gbps with four links and 80Gbps with eight links.

There are two stacking transceivers. They are the AT-StackOP/0.3 and AT-StackOP/9.0 transceivers. Both transceivers use fiber optic cables. The difference between them is their maximum operating distances. One transceiver has a maximum operating distance of 300 meters and the other has a distance of 9 kilometers. The correct transceiver for your installation will depend on the distance between the two chassis of the stack. The transceivers are listed in Table 23.

Table 23. Stacking Transceivers

Stacking Transceiver Model	Cable Type	Operating Distance
AT-StackOP/0.3	62.5/125 µm multi-mode fiber optic cable	33 meters (108 feet)
	50/125 µm multi-mode fiber optic cable	300 meters (984 feet)
AT-StackOP/9.0	9/125 µm single-mode fiber optic cable	9 kilometers

Here are the transceiver guidelines:

- The stacking transceivers can only be used in the SFP+ slots on the AT-SBx81CFC960 Controller Fabric Card and only with the

VCStack Plus feature.

- The stacking transceivers must be connected to other stacking transceivers. You may not use them as regular networking ports.
- The VCStack Plus feature must be activated on the two switches of the stack for the SFP+ slots and stacking transceivers to forward stack traffic.
- You may use the SFP+ slots on the controller card with standard SFP+ transceivers when the VCStack Plus feature is disabled on the chassis.

Cabling Configurations for the Stacking Transceivers

This section illustrates the cabling configurations for the stacking transceivers.

One Controller Card Per Chassis

Figure 176 illustrates the correct wiring configuration for the fiber optic wires for the stacking transceivers when each chassis has only one AT-SBx81CFC960 Controller Fabric Card. The transceiver in SFP+ slot 1 in one controller card is connected to the transceiver in SFP+ slot 1 in the card in the other chassis, the transceiver in SFP+ slot 2 is connected to the transceiver in SFP+ slot 2 in the other chassis, and so on.

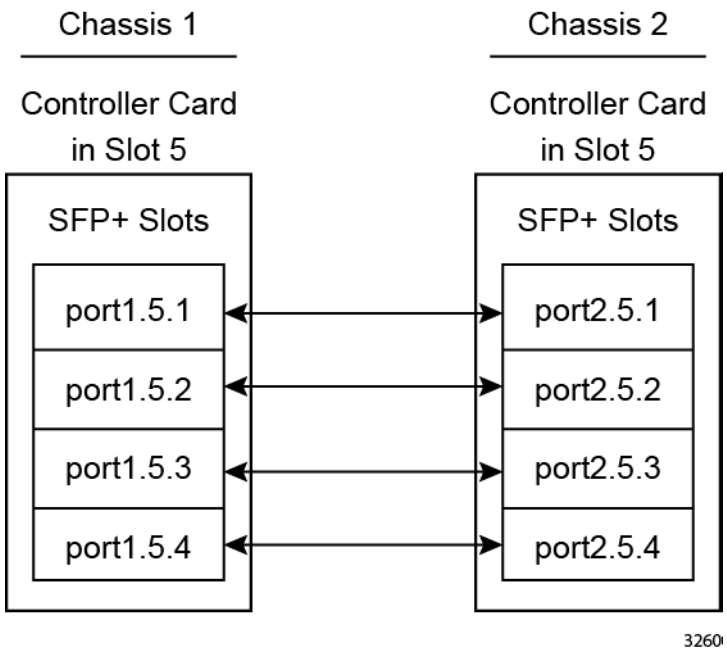


Figure 176. Cabling the Stacking Transceivers When Both Switches have One Controller Card

Please note the following:

- The trunk has a maximum bandwidth of 40Gbps when each chassis has one controller card and the trunk has four links.
- The switches will form the stack even if the transceivers are cabled incorrectly such that the wires between transceivers crossover (e.g., the transceiver in SFP+ slots 1 is connected to the transceiver in SFP+ slot 2). However, the bandwidth of the trunk is reduced.

Two Controller Cards Per Chassis

Figure 177 illustrates the wiring configuration when both switches have two controller cards.

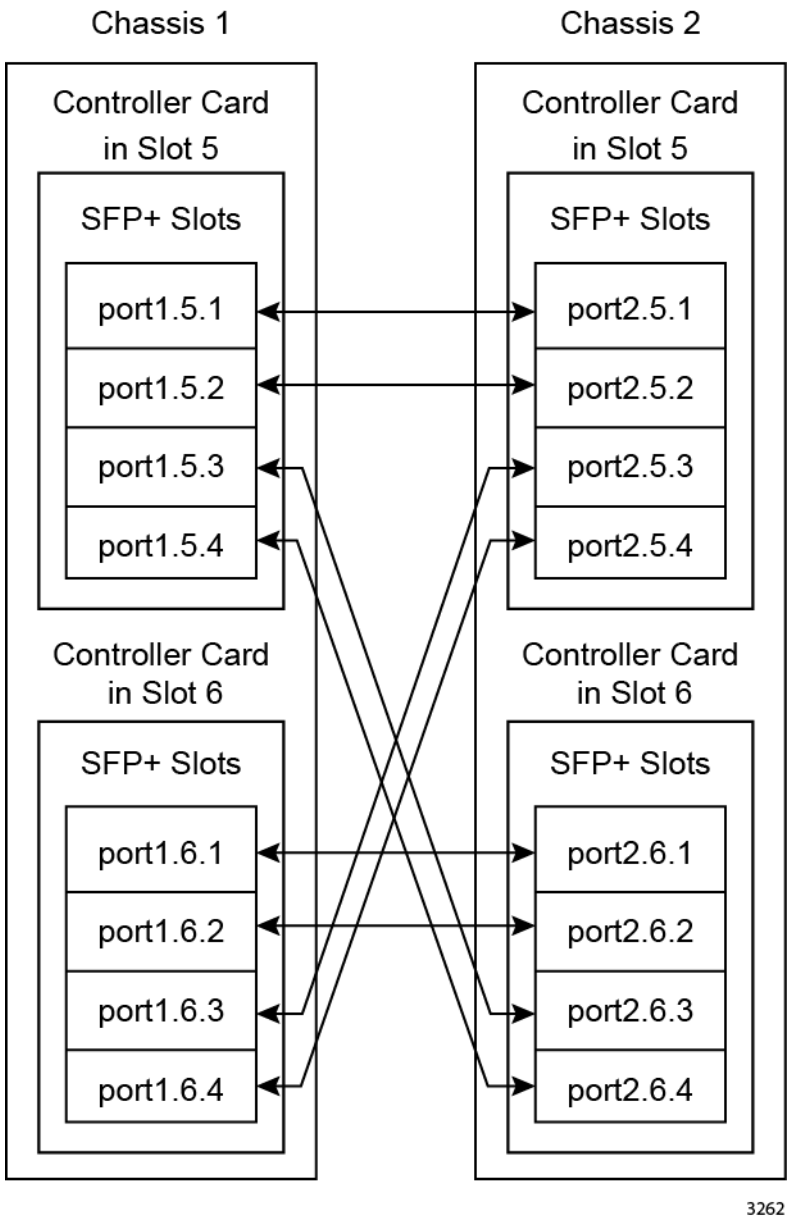


Figure 177. Cabling the Stacking Transceivers When Both Switches have Two Controller Cards

Please note the following:

- The trunk has a bandwidth of 80Gbps in both directions when each chassis has two controller cards.
- The switches can form the stack even if the transceivers are cabled incorrectly such that the wires between transceivers crossover (e.g., the transceiver in SFP+ slots 1 is connected to the

transceiver in SFP+ slot 2). However, the bandwidth of the trunk is reduced.

Note

Do not install the stacking transceivers in the SFP+ slots on the AT-SBx81CFC960 Controller Fabric Cards until after you have activated the stacking feature on the two chassis.

VCStack Plus Feature License

A key component of the stack is the VCStack Plus feature license from Allied Telesis. The license contains an activation code that activates the stacking feature in the management software on the controller cards in the chassis.

Each chassis must have its own VCStack Plus license. The licenses must be installed while the switches are operating as stand-alone units. A chassis that has two controller cards needs only one license because the active master controller card shares the license with the standby master card in the same chassis at the time you install the license. But the license is not shared between different switches, which is why the two chassis of the stack have to have their own licenses.

Here are the VCStack Plus feature license guidelines:

- Each chassis must have a license.
- A chassis that has two controller cards needs only one license.
- The licenses from Allied Telesis may have the same or different activation codes. The switches will form the stack regardless of whether they have the same or different activation codes.
- The licenses have to be installed while the units are operating as stand-alone switches.

Optional Feature Licenses

The SwitchBlade x8112 product has two optional feature licenses that activate additional features on the switch:

- Premium license
- AMF Master license

You may install an optional feature license while the switches are operating as stand-alone units or when they are a stack. However, when you are initially building the stack, both switches must have the same optional feature licenses. Otherwise, the two units will not form the stack. So if you install an optional feature license on one of the switches while it is operating as a stand-alone unit, you have to install the same feature license on the second unit as well before building the stack.

Once the two chassis are operating as a stack, you only have to install a feature license once because the active master controller card automatically shares it with all the controller cards in the stack.

Here are the guidelines to ordering and installing feature licenses.

- Feature licenses are ordered from Allied Telesis on a per chassis basis.
- A chassis that has two controller cards needs only one feature license.
- You have to order two features licenses, one for each chassis, when building a stack, even though you might only use one of the licenses.
- You may install optional feature licenses either while the switches are operating as stand-alone units or after they are operating as a stack.
- If the two chassis don’t have any optional feature licenses or have the same licenses, you might as well wait until after you build the stack before installing any additional licenses. That way, you only have to install one feature license for the entire stack.
- You cannot build a stack of two chassis that have different feature licenses. If necessary, you must remove or install licenses on the switches so they both have the same licenses before you build the stack. For example, if one chassis has the premium feature license while the second chassis does not, you have to install the premium license on the second unit while it is operating as a stand-alone unit.

The instructions in Chapter 15, “Building a Stack” on page 283 explain how to determine whether the switches have the same feature licenses.

Chassis ID Numbers

The switches in the stack have to be assigned ID numbers. The valid ID numbers are 1 and 2. A switch can have only one ID number. The two switches of the stack must be assigned different ID numbers. The switches will not form a stack if they have the same ID number. The value is set at the chassis level. A chassis that has two controller cards has one ID number.

You use the numbers in the commands in the command line interface to identify the two units of the stack when you configure the parameters of the ports and modules of the switches. The chassis ID number is the first number in the numbering format, shown in Figure 178.

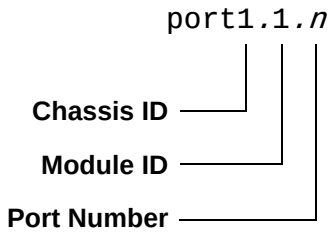


Figure 178. Chassis ID Number in the Numbering Format

You should decide on the ID numbers of the units before starting the configuration procedure and place labels with the numbers on the units to make it easier for you to remember their assignments.

In most cases, it does not matter which switch is assigned ID number 1 and which switch is given ID number 2. You just need to be sure to assign them different numbers during the configuration procedure and to use the appropriate numbers when configuring the devices with the command line interface.

There is, however, one situation where the assignments of the ID numbers can be important. If one of the switches is operating as a stand alone unit and you want it to maintain its configuration settings when it joins the stack, you should assign it the ID number 1. That way, the chassis maintains its configuration when it becomes a part of the stack. For example, you might install a chassis as a stand-alone unit and later decide to add a second unit to form a stack. In this case you might want the first switch to maintain its configuration settings when you add the second unit and build the stack. By assigning the ID number 1 to the existing switch and the ID number 2 to the new switch, the existing switch maintains the configuration settings that it had as a stand-alone unit, after it joins the stack. (You would also need to assign the existing switch a low priority number, so that its controller card become the master card of the stack. For more information, refer to “Priority Numbers” on page 279.)

Priority Numbers

The switches of the stack perform an initialization procedure whenever they are reset or powered on. During the process, which involves activating the management software and forming the stack, the units select the active master controller card. This card is responsible for maintaining the configuration file that contains the parameter settings for all the devices in the stack and for periodically sharing the configuration file with the other controller cards.

The stack can have only one active master controller card. The other cards are referred to as standby master controller cards. If, for instance, the stack has four controller cards, one of the cards acts as the active master card and the other three function as standby master cards.

Standby master controller cards are not inactive. Rather, they forward traffic between the Ethernet line cards on the backplanes of their chassis and manage traffic on their SFP+ slots and the stack trunk.

The method by which the controller cards select the active master controller card depends on whether the switches are rebooted simultaneously or one after the other.

If the switches are powered on or reset simultaneously, the controller cards use the following values to select the active maters controller card for the stack:

- Slot numbers
- Priority numbers
- MAC addresses

At the start of the selection process, the switches, if they both have two controller cards, select an active card for their respective chassis, by slot number. In most cases, preference is given to the controller card in slot 5.

After each switch has selected an active controller card, the two active cards in the switches communicate over the stack trunk to select the active master controller card for the entire stack. To accomplish this, they first compare their priority numbers. The number has a range of 0 to 255. The default is 128. The lower the number, the higher the priority. If one of the controller cards has a lower priority number, it becomes the active controller card for the stack and the other card is placed in the standby master mode, along with the other controller cards.

If the controller cards have the same priority number, they compare their MAC addresses. The controller card with the lower MAC address becomes the active master controller card for the stack.

Setting the priority number during the stack configuration procedure is

optional. If you choose not to set the value, the controller cards use their MAC addresses to select the active master controller card for the stack.

The process for selecting the active master controller card is different if the two switches are reset or power on one after the other. Here, the controller card that initializes its management software first becomes the active master controller card for the stack.

Once the active controller card is selected, it remains the active card unless it fails or is removed from its chassis, at which point another controller card becomes the active controller card for the stack.

Stacking Guidelines

Here are the stacking guidelines:

- The stack can have two switches.
- The switches of the stack must be the same model. The stack can have two AT-SBx8112 chassis or two AT-SBx8106 chassis. A stack cannot have one AT-SBx8112 chassis and one AT-SBx8106 chassis.
- The trunk that connects the two switches of the stack are built with AT-StackOP/0.3 or AT-StackOP/9.0 stacking transceivers in the SFP+ slots in the controller cards.
- There cannot be any network devices, such as other switches or media converters, between the stacking transceivers in the two switches.
- The bandwidth of the trunk depends on the number of controller cards and stacking transceivers in the switches. The trunk has a bandwidth of 40 Gbps when each switch has one controller card, and 80 Gbps when each switch has two controller cards, For more information, refer to “Stack Trunk and Stacking Transceivers” on page 271.
- The SFP+ slots on the controller cards support the stacking transceivers only when stacking is enabled on the switch. Standard SFP+ transceivers are not supported in the SFP+ slots when stacking is enabled.
- When stacking is disabled, the SFP+ slots can be used with standard SFP+ transceivers, but not with stacking transceivers. The default setting for stacking is disabled.
- The switches have to be assigned ID numbers. The numbers are 1 and 2. The switches must be assigned different numbers. For more information, refer to “Chassis ID Numbers” on page 278.
- A stack should not have more than 400 Ethernet ports.
- If both switches of the stack have two controller cards, the SFP+ slots on both the active master and inactive master controller cards are active in linking the units together and forwarding traffic.
- The two switches of the stack must have the same OEM territory and feature licenses.
- The two switches of a stack do not share the AlliedWare Plus operating system.

Chapter 15

Building a Stack

This chapter contains step-by-step instructions on how to configure the switches to build a stack with the VCStack Plus feature. The chapter contains the following sections:

- ❒ “Before You Begin” on page 284
- ❒ “Displaying the Management Software Version Number” on page 285
- ❒ “Activating the VCStack Plus Feature License” on page 287
- ❒ “Enabling the Stacking Feature” on page 289
- ❒ “Displaying the Feature Licenses” on page 291
- ❒ “Setting the ID Number” on page 293
- ❒ “Setting the Priority Number” on page 297
- ❒ “Powering Off the Chassis” on page 298
- ❒ “Configuring the Second Chassis” on page 299
- ❒ “Installing and Cabling the Stacking Transceivers” on page 300
- ❒ “Powering On the Stack” on page 303
- ❒ “Verifying the Stack” on page 307
- ❒ “Installing Optional Feature Licenses” on page 309
- ❒ “Troubleshooting the Stack” on page 310

Before You Begin

Please review the following information before you begin to configure the switches for stacking:

- You must perform the procedures in the order presented here.
- You should configure only one chassis at a time.
- The procedures are the same regardless of whether a chassis has one or two controller cards.

Note
This procedure requires power cycling or resetting the switches. Some network traffic may be lost if the units are already connected to an active network.

The procedures assume the following:

- All hardware components have been installed in the two switches, including Ethernet line cards, controller cards, and power supplies. For installation instructions, refer to the previous chapters in this guide.
- The switches are powered on. For instructions, refer to Chapter 9, “Powering On the Chassis” on page 171.
- You verified the operations of the chassis with the procedures in Chapter 10, “Verifying the Hardware Operations of the Chassis” on page 209.
- There are no transceivers in the SFP+ slots on the AT-SBx81CFC960 Controller Fabric Cards. If there are transceivers in the slots, you should remove them before performing the procedure.

A stack requires these additional items:

- Two VCStack Plus feature licenses: Each chassis must have its own license. For more information, refer to “VCStack Plus Feature License” on page 276.
- Eight AT-Stack transceivers if each switch in the stack has one controller card and sixteen transceivers if each switch has two controller cards. The transceivers form the trunk that connects the two switches together. For more information, refer to “Stack Trunk and Stacking Transceivers” on page 271.

Displaying the Management Software Version Number

This procedure explains how to display the version number of the AlliedWare Plus operating software on the active controller card in the chassis. The two chassis of the stack must have the same version of operating system. To display the management software version number, perform the following procedure:

1. Start a local or remote management session on the switch. For instructions on how to start a local session, refer to “Starting a Local Management Session” on page 212.

2. When prompted, enter the manager name and password to log on. The default values are “manager” and “friend,” respectively.

   The switch displays the User Exec mode prompt, shown here:

```
awplus>
```

3. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode:

```
awplus> enable
awplus#
```

4. In the Privileged Exec mode, enter the SHOW SYSTEM command.

```
awplus# show system
```

5. Examine the output of the command for the lines in Figure 179.

```
Current software: SBx81CFC960-5.4.4.rel
Software version : 5.4.4
```

Figure 179. SHOW SYSTEM Command

Note
If the management software is version 5.4.3 or less, do not continue. The switch has the older AT-SBx81CFC400 Controller Fabric Card, which does not support stacking.

6. Do one of the following:

   - If you are configuring the first chassis of the stack, write down on paper the software version number of the AlliedWare Plus operating software on the active controller card. You will compare it with the same information on the second chassis to confirm that both units have the same version of management software. After

writing the information, go to “Activating the VCStack Plus Feature License” on page 287.

- If you are configuring the second chassis, compare the version number displayed by the SHOW SYSTEM command against the version number you wrote down on paper from the first chassis. If the two chassis have the same management software and the version number is 5.4.4 or greater, you may go to “Activating the VCStack Plus Feature License” on page 287. If they are different, you must upgrade the management software on one or both units so that they have the same version. For upgrade instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches. After updating the management software, go to “Activating the VCStack Plus Feature License” on page 287.

Activating the VCStack Plus Feature License

This procedure explains how to use the VCStack Plus feature license you obtained from Allied Telesis to activate the VCStack Plus feature license on the active controller card in the chassis. The license consists of an alphanumeric key and a recommendation for the license name.

Please note the following before performing this procedure:

- The two chassis in the stack must have their own licenses.
- A chassis that has two controller cards needs only one VCStack Plus feature license because the active master card automatically shares it with the inactive master card.
- The encryption keys on the VCStack Plus feature licenses you receive from Allied Telesis may be the same or different. The two switches can form a stack regardless of whether the encryption keys are the same or different.

The procedure assumes you are continuing directly from the previous procedure.

To activate the VCStack Plus feature license on the active controller card in the chassis, perform the following procedure:

1. In the Privileged Exec mode, use the LICENSE command to activate the VCStack Plus feature on the active controller card.

   .Here is the format of the command:

   `license` *`name key`*

   The NAME parameter is the name of the license. You may use the name that comes with the license or you may enter a different name. The name can be from one to fifteen characters. Spaces are not allowed. An example of a name for this feature is VCStackPlus.

   The KEY parameter is the alphanumeric key that comes with the license. It activates the feature license on the switch. The key is case sensitive, meaning that you have to use uppercase and lowercase characters when you specify the key in the command.

   Here is an example of the command. The license is assigned the name VCStackPlus and has the key 1234ABCD:

```
awplus# license VCStackPlus 1234ABCD
```

Note
If the chassis has two controller cards, the active controller automatically activates the VCStack Plus feature license on the standby controller.

After you enter the command, the switch displays the prompt in Figure 180:

```
A restart of affected modules may be required.
Would you like to continue? (y/n)
```

Figure 180. LICENSE Command

2. Type Y for yes to activate the license on the controller card. (This does not reset the chassis or modules. You will reboot the chassis later in these instructions.)

   If the chassis has two controller cards, the active controller card automatically shares the VCStack Plus feature license with the standby card and displays the messages in Figure 181.

```
Card 1.5 installed 1 license
Card 1.6 installed 1 license

2 licenses installed
```

Figure 181. LICENSE Command Message with Two Controller Cards

If the chassis has only one controller card, the controller card displays the message in Figure 182.

```
Card 1.5 installed 1 license

1 license installed
```

Figure 182. LICENSE Command Message with One Controller Card

3. Go to “Enabling the Stacking Feature” on page 289.

Enabling the Stacking Feature

Now that you have activated the VCStack Plus feature license on the controller card, you may enable the stacking feature, as explained in this section.

To activate the stacking feature, perform the following procedure:

1. Enter the CONFIGURE TERMINAL command to move from the Privileged Exec mode to the Global Configuration mode:

```
awplus# configure terminal
awplus(config)#
```

2. Enter the STACK ENABLE command to activate the VCStack Plus feature:

```
awplus(config)# stack enable
```

The switch displays the messages in Figure 183

```
% Automatically enabling ‘stack virtual-mac’ to minimize disruption from
failovers.
% Please check that the new MAC 0000.cd37.0c22 is unique within the network.
% Save the config and restart the system for this change to take affect.
```

Figure 183. STACK ENABLE Command Messages

The messages are described in Table 24.

Table 24. Descriptions of the STACK ENABLE Command Messages

Message	Description
Automatically enabling ‘stack virtual-mac’ to minimize disruption from failovers.	This message informs you that enabling the stacking feature also activates the virtual MAC address feature, which allows the two switches of the stack to use a single MAC address to communicate with other network devices.
Please check that the new MAC 0000.cd37.0c22 is unique within the network.	This message displays the virtual MAC address of the switch. The address is randomly selected from the range of 0000.cd37.0000 to 0000.cd37.0fff.

Table 24. Descriptions of the STACK ENABLE Command Messages

Message	Description
Save the config and restart the system for this change to take effect.	This message reminds you that you need to save the configuration change and reboot the switch to activate stacking. The next two steps have you save your changes, You will reboot the switch later in these procedures.

3. Enter the EXIT command to return to the Privileged Exec mode.

```
awplus(config)# exit
awplus#
```

4. Enter the COPY RUNNING-CONFIG command to save your changes:

```
awplus# copy running-config startup-config
```

5. Continue to the next procedure to check the feature licenses on the switch.

Displaying the Feature Licenses

The two switches of a stack must have the same feature licenses. Otherwise, they will not form a stack. To compare the licenses of the switches, perform the following procedure:

1. Enter the SHOW LICENSE BRIEF command in the Privileged Exec mode to display the licenses on the switch.

```
awplus# show license brief
```

   Figure 184 is an example of the information.

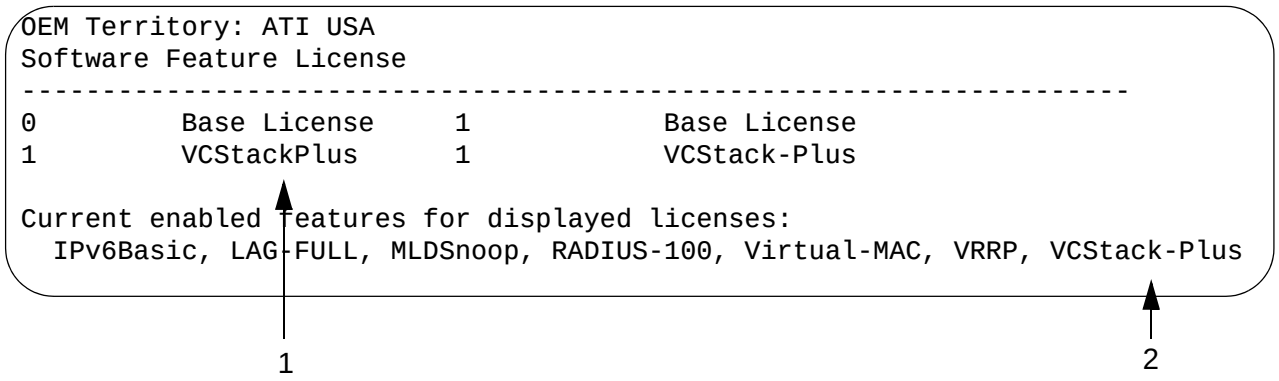

OEM Territory: ATI USA
Software Feature License
0 Base License 1 Base License
1 VCStackPlus 1 VCStack-Plus
Current enabled features for displayed licenses:
IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100, Virtual-MAC, VRRP, VCStack-Plus
1
2

Figure 184. SHOW LICENSE BRIEF Command

2. Check the SHOW LICENSE BRIEF command for the following information:

   - (1) Verify that the VCStack Plus feature license is included in the list of licenses. If it is not included, repeat “Activating the VCStack Plus Feature License” on page 287.
   - (2) Verify that the VCStack Plus feature is enabled on the switch. If it is not enabled, repeat “Enabling the Stacking Feature” on page 289

3. Do one of the following:

   - If you are configuring the first chassis of the stack, write down on paper the OEM territory, licenses, and enabled features from the SHOW LICENSE BRIEF command. You will compare this information with the license information on the second chassis to be sure that both units have the same features. After writing the information, go to “Setting the ID Number” on page 293.
   - If you are configuring the second chassis, compare the information displayed by the SHOW LICENSE BRIEF command against the license information you wrote down on paper when you configured

the first chassis. If the two chassis have the same licenses and enabled features, you may go to “Setting the ID Number” on page 293. If they are different, do not continue. The two chassis cannot form a stack if they do not have identical features. Before continuing with this procedure, add or delete features or licenses from one or both chassis so that they have the same feature set.

Note

Two switches that have different OEM territories probably have different feature sets. The two switches will form a stack but only if they have the same features. This may require the installation or deletion of features or licenses from one or both units.

Setting the ID Number

The chassis must be assigned the ID number 1 or 2. The ID number is used to identify the chassis when you configure the device with the command line interface. The two chassis of the stack must be assigned different ID numbers. To set the ID number on the chassis, perform the following procedure:

1. From the Privileged Exec mode, enter the SHOW STACK command to view the current ID number of the switch:

```
awplus# show stack
```

   Figure 185 is an example of the command.

```
Virtual Chassis Stacking summary information

ID     Pending ID     MAC address     Priority     Status     Role
1.5    -              eccd.6d9e.07e1  128          Ready      Active CFC
1.6    -              eccd.6d9e.0145  128          Ready      Backup Member
```

Current ID Numbers

Figure 185. SHOW STACK Command

   The command lists the AT-SBx81CFC960 Controller Fabric Cards in the stack. Given that the switch is not operating as part of a stack yet, the command lists only the controller cards in the switch you are currently configuring. The switch in Figure 185 has two controller cards. The command displays only one controller card if the chassis has only one card.

   The ID number of a controller card contains two numbers. The first number is the chassis ID number. This number is always 1 or 2. If the chassis has two controller cards, both cards have the same chassis ID number. The second number is the slot number in which the controller card is installed. For example, the first controller card in the example has the ID number 1.5, meaning that the card has the chassis ID number 1 and is installed in slot 5 of the unit. The second controller card has the same chassis ID number and is installed in slot 6.

2. Check the chassis ID number of the controller cards. (As just explained, the chassis ID number is the first number in the ID number.) The chassis ID number can be 1 or 2. The default value is 1. The two chassis of a stack must have different ID numbers. Do one of the following:

   - If the ID number is already set correctly for the chassis, go to “Setting the Priority Number” on page 297. For example, if you are

configuring the first switch of the stack and want to assign it the number 1, you probably do not need to set the number because that is the default value.

- If you need to change the ID number for the chassis, continue with step 3. For example, if you are configuring the second chassis and want to assign it the ID number 2, you need to perform the rest of this procedure to change it from the default value 1 to the new value 2.

3. Enter the CONFIGURE TERMINAL command to enter the Global Configuration mode:

```
awplus# configure terminal
awplus(config)#
```

4. To assign the switch a new ID number (for instance, to change it from1 to 2), enter the STACK RENUMBER command, which has this format:

```
stack <member's-existingID> renumber <member's-newID>
```

The member's-existingID variable is the switch's current ID number, displayed with the SHOW STACK command in step 9. The member's-newID variable is the new ID number you want to assign it. This example of the command changes the ID number of the switch from 1 to 2:

```
awplus(config)# stack 1 renumber 2
```

Note
If the chassis has two controller cards, the command changes the chassis ID number on both cards.

The command displays the messages in Figure 186.

```
% Warning: Stacking is currently disabled.
% Warning: The new ID will not become effective until the stack-member
reboots.
% Warning: The boot configuration may now be invalid.
```

Figure 186. STACK RENUMBER Command Messages

The messages are described in Table 25 on page 295.

Table 25. Descriptions of the STACK RENUMBER Command Messages

Message	Description
Warning: Stacking is currently disabled.	This message reminds you that even though you activated the stacking feature with the STACK ENABLE command in an earlier procedure, the feature is disabled because the chassis has not been reset. You will reboot the switch later in these instructions.
Warning: The new ID will not become effective until the stack-member reboots.	This message informs you that the switch needs to be reset before it begins to use its new ID number. You will reboot the switch later in these instructions.
Warning: The boot configuration may now be invalid.	This message informs you that if you have already configured parameter settings on the switch, some of the settings may be lost when you reset the unit. The ID number is used in the commands in the configuration file to identify the individual switch ports. When the ID number is changed, commands in the configuration file that use the old ID number are no longer valid.

5. After changing the ID number, enter the EXIT command to return to the Privileged Exec mode:

```
awplus(config)# exit
awplus#
```

6. Enter the SHOW STACK command again to confirm your change.

   An example of the window is shown in Figure 187 on page 296.

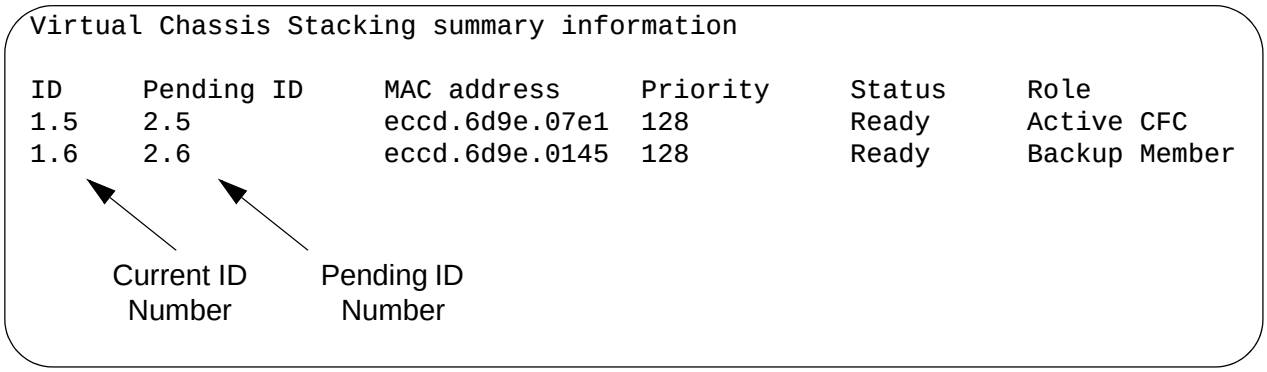

Virtual Chassis Stacking summary information
ID Pending ID MAC address Priority Status Role
1.5 2.5 eccd.6d9e.07e1 128 Ready Active CFC
1.6 2.6 eccd.6d9e.0145 128 Ready Backup Member
Current ID Number
Pending ID Number

Figure 187. SHOW STACK Command

7. Verify the pending ID number change.

   Each controller card should now have two ID numbers. The number in the ID column is the current number of the chassis and the number in the Pending ID column is the number you just assigned it. The new number takes effect when you reboot the chassis later in these instructions.

   Do one of the following:

   - If the Pending ID column is empty or is not displaying the correct number, repeat the procedure starting with step 3.
   - If the Pending ID column is displaying the correct ID number, continue with the next step.

8. Enter the COPY RUNNING-CONFIG command to save your change:

```
awplus# copy running-config startup-config
```

9. Continue to the next procedure to set the priority number on the chassis.

Setting the Priority Number

This procedure is optional. It explains how to set the stack priority number on the chassis, which controls the selection of the active controller card for the stack. For background information, refer to “Priority Numbers” on page 279. If you do not want to set the priority number, go to “Powering Off the Chassis” on page 298.

To configure the priority number, perform the following procedure:

1. Enter the CONFIGURE TERMINAL to move from the Privileged Exec mode to the Global Configuration mode.

```
awplus# configure terminal
awplus(config)#
```

2. Enter the STACK PRIORITY command to set the priority number of the chassis. The format of the command is as follows:

```
stack <ID_number> priority <priority_number>
```

   The ID_number variable is the switch’s current ID number, displayed with the SHOW STACK command. The priority_number variable is the new priority number for the chassis. The range is 0 to 255. The lower the number, the higher the priority. This example sets the priority number of the chassis to 1:

```
awplus(config)# stack 1 priority 1
```

   The switch displays the following prompt:

```
% Warning: Stacking is currently disabled.
```

3. Enter the EXIT command to return to the Privileged Exec mode:

```
awplus(config)# exit
awplus#
```

4. Enter the SHOW STACK command to confirm your change. Refer to Figure 187 on page 296. The Priority column should now be displaying the new priority number for the chassis.

5. Enter the COPY RUNNING-CONFIG command to save your change:

```
awplus# copy running-config startup-config
```

This completes the procedure for configuring the chassis for the stacking feature. Go to “Powering Off the Chassis” on page 298.

Powering Off the Chassis

Now that you have configured the chassis, you should power it off. To power off the unit, do one of the following:

- If the chassis has the AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 PoE power supplies, disconnect the AC power cords from the connectors on the back panel of the unit or from the power sources.
- If the unit has the AT-SBxPWRSYS1 DC power supply, turn the power switch on the power supply to off. Refer to Figure 62 on page 124.

Be sure to power off all the power supplies in the chassis.

After powering off the chassis, do one of the following:

- To configure the second chassis, go to “Configuring the Second Chassis” on page 299
- If you are finished configuring both chassis, go to “Installing and Cabling the Stacking Transceivers” on page 300.

Note
Powering off the chassis to install the stacking transceivers is optional. The transceivers are hot-swappable and can be installed while the chassis is powered on. However, Allied Telesis recommends that both chassis be powered off when you power on the stack for the first time.

Note
If you decide not to power off the chassis, you must reset both units with the REBOOT command in the Privileged Exec mode after installing the stacking transceivers in “Installing and Cabling the Stacking Transceivers” on page 300.

Configuring the Second Chassis

Configure the second chassis by repeating the previous procedures, starting with “Displaying the Management Software Version Number” on page 285. Please note the following as you configure the second unit:

- In “Displaying the Management Software Version Number” on page 285, be sure that the management software on the switch is version 5.4.4 or greater and that it is the same version as management software on the first chassis.
- In “Activating the VCStack Plus Feature License” on page 287, be sure to assign the second chassis a VCStack Plus license.
- In “Activating the VCStack Plus Feature License” on page 287, be sure to check that the second chassis has the same licenses and features as the first chassis.
- In “Setting the ID Number” on page 293, be sure to assign the second chassis a different ID number. For instance, you should assign the second chassis the ID number 2 if the first chassis has the ID number 1.

After configuring the second chassis, go to “Installing and Cabling the Stacking Transceivers” on page 300.

Installing and Cabling the Stacking Transceivers

For background information on the stacking transceivers, refer to “Stack Trunk and Stacking Transceivers” on page 271. For background information on the cabling configurations, refer to “Cabling Configurations for the Stacking Transceivers” on page 273.

To install the stacking transceivers in the SFP+ slots on the controller cards of the two chassis, perform the following procedure:

1. Remove the dust cover from one of the SFP+ slots on the AT-SBx81CFC960 Controller Fabric Card. Refer to Figure 188.

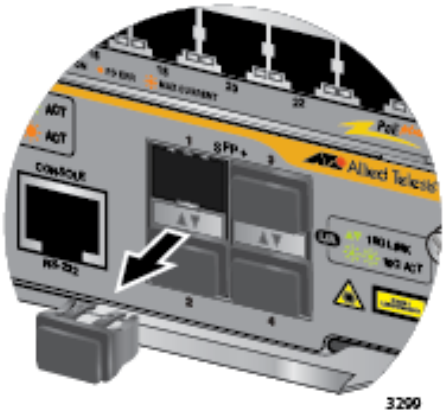


Figure 188. Removing the Dust Cover from an SFP+ Slot on the AT-SBx81CFC960 Controller Fabric Card

2. Orient the stacking transceiver with the handle on top if you are installing it in slot 1 or 3, or with the handle on the bottom for slot 2 or 4. Refer to Figure 189.

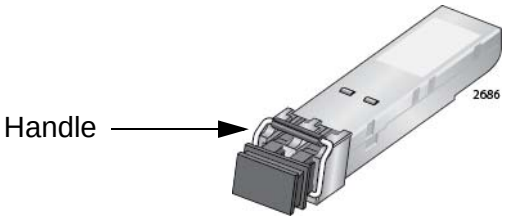


Figure 189. Handle on the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers

3. Slide the transceiver into the slot until it clicks into place. Refer to Figure 190 on page 301.

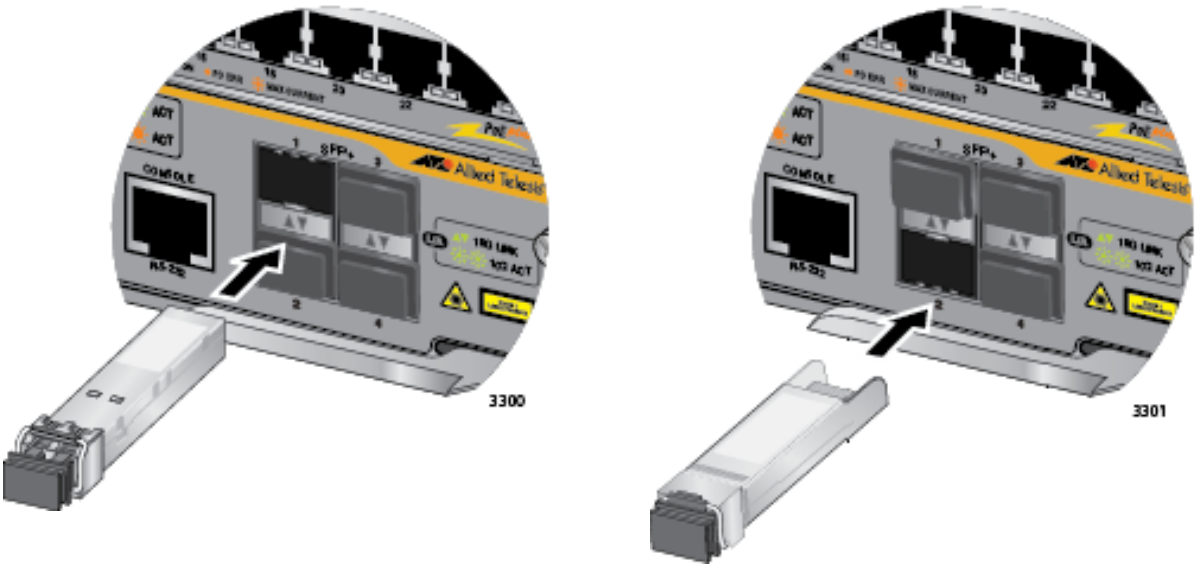


Figure 190. Installing the AT-StackOP/0.3 or AT-StackOP/9.0 Transceiver

4. Remove the dust cover from the transceiver, as shown in Figure 191.

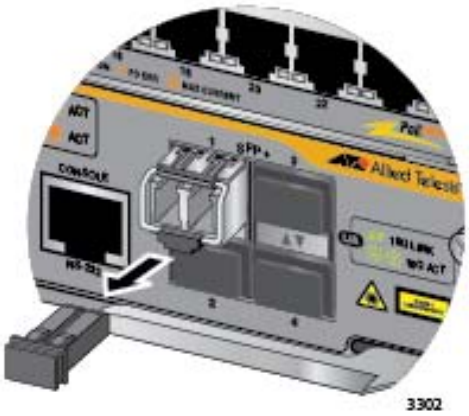


Figure 191. Removing the Dust Cover from a Stacking Transceiver

5. Verify the position of the handle on the transceiver. If the transceiver is in slot 1 or 3, the handle should be in the upright position, as shown in Figure 192 on page 302. If the transceiver is in slot 2 or 4, the handle should be in the down position.

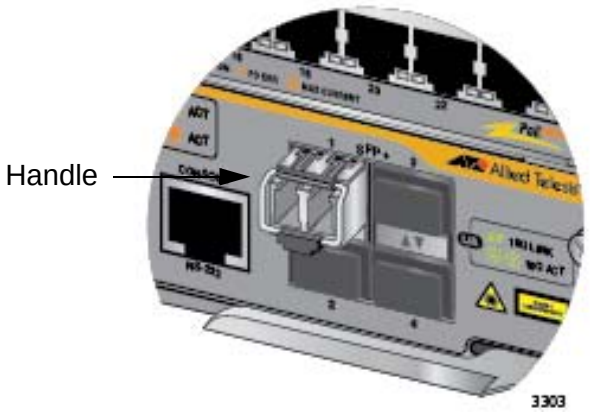


Figure 192. Positioning the Handle on the Transceiver

6. Connect the fiber optic cable to the transceiver, as shown in Figure 193. The connector on the cable should fit snugly into the port, and the tab should lock the connector into place.

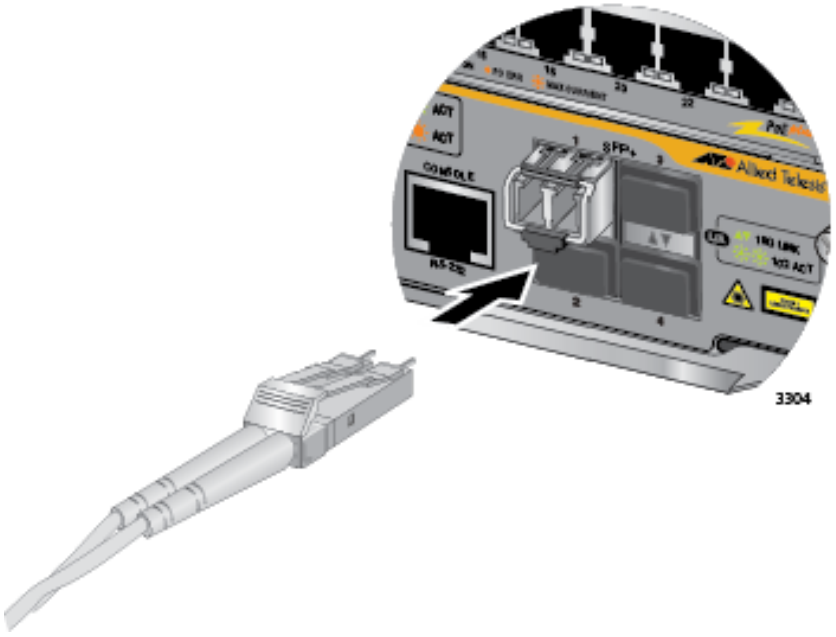


Figure 193. Connecting a Fiber Optic Cable to a Stacking Transceiver

7. Repeat this procedure to cable all the stacking transceivers on both switches. Afterwards, go to “Powering On the Stack” on page 303.

Powering On the Stack

The two switches are now ready to operate as a stack. But before powering on the stack for the first time, you may find it useful to review the information in “Controlling the Selection of the Initial Active Master Controller Card” on page 303. The information is important if one of the switches was a stand-alone unit in your network and you want it to retain its configuration when it becomes part of the stack.

Note
If you decided not to power off the chassis earlier in these instructions, you must reset both units with the REBOOT command in the Privileged Exec mode. After resetting the units, go to “Monitoring the Boot Up Sequence” on page 304 or “Verifying the Stack” on page 307.

Controlling the Selection of the Initial Active Master Controller Card

The manner in which you power on the units can determine which controller card becomes the active master controller card for the stack. This, in turn, can determine the initial configuration of the stack. In some situations you may want to control which controller card becomes the initial active master card.

There are two ways to power on the switches of the stack, either simultaneously or one after the other:

- If you power on the units simultaneously, the controller cards use their priority values or MAC addresses to determine the active master card for the stack. The selected active card uses the settings in its configuration file as the initial configuration for the stack. For background information, refer to “Priority Numbers” on page 279.
- If you power on one switch, wait a minimum of ten seconds, and then power on the other unit, the active master controller card in the unit first powered on becomes the master controller card for the stack. Its configuration file becomes the initial configuration for the stack.

The selection of the active master card might not be important to you if the units and controller cards of the stack are new. Here, the stack uses the default settings regardless of which controller card becomes the active card. If this is the case, you can power on the units either way,

However, if one of the switches was a stand-alone unit in your network and you are adding a new chassis to build a stack, you might want to retain the stand-alone configuration on the first switch to avoid having to reconfigure it when it becomes part of the stack. You can do this by powering it on first

so that its active master controller card becomes the active card for the stack and its configuration file is used as the initial configuration for the stack.

After the stack is operating, the active master card periodically shares its configuration file with all the other controller cards in the stack. Thus, the order in which the units are subsequently reset or powered on is not important because all the controller cards have the same configuration file.

Powering On the Switches

To power on the two chassis of the stack, do one of the following:

- To power on the AT-SBxPWRSYS1 AC and AT-SBxPWRPOE1 PoE Power Supplies, connect the power cords to the appropriate connectors on the back panel and to power sources. For instructions, refer to “Powering On the AT-SBxPWRSYS1 AC System Power Supply” on page 173 and “Powering On the AT-SBxPWRPOE1 Power Supply” on page 176, respectively.
- To power on the AT-SBxPWRSYS1 DC Power Supply, turn the power switch to on. Refer to Figure 62 on page 124.

Be sure to power on all the power supplies in the chassis.

Note
To power on the two chassis in sequence to control the selection of the active master controller card, power on one unit and then wait a minimum of ten seconds before powering on the second unit.

The boot up sequence for the stack takes approximately four minutes. The amount of time may vary, depending on the number and types of Ethernet line cards in the two switches. The ports do not begin to forward traffic until the stack has completed the initialization process.

Do one of the following:

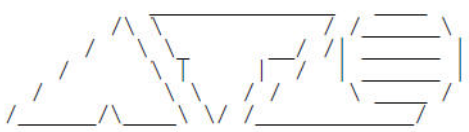
- If you want to monitor the switches as they perform the initialization process, go to “Monitoring the Boot Up Sequence” on page 304.
- If you do not want to monitor the initialization process, go to “Verifying the Stack” on page 307.

Monitoring the Boot Up Sequence

You may monitor the initialization process by connecting a terminal or PC with a terminal emulator program to the Console port on any of the controller cards and watch the status messages, shown in Figure 194 on page 305 and Figure 195 on page 306. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 212.)

After the stack has completed the initialization process, go to “Verifying the Stack” on page 307.

```
Verifying release... OK
Booting...
Starting base/first...                          [ OK ]
Mounting virtual filesystems...                 [ OK ]
```



```
Allied Telesis Inc.
AlliedWare Plus (TM) v5.4.4
Current release filename: SBx81CFC960-5.4.4-0.0.rel
Original release filename: SBx81CFC400-5.4.4-.0.rel
Built: Thu Dec 19 21:30:52 NZDT 2013
Mounting static filesystems...                   [ OK ]
Checking flash filesystem...                     [ OK ]
Mounting flash filesystem...                     [ OK ]
Checking for last gasp debug output...           [ OK ]
Checking NVS filesystem...                       [ OK ]
Mounting NVS filesystem...                       [ OK ]
Starting base/setup-eth..                        [ OK ]
Starting base/dbus...                            [ OK ]
Starting base/syslog...                          [ OK ]
Starting base/lif_ok...                          [ OK ]
Starting base/loopback...                        [ OK ]
Starting base/poe_done...                        [ OK ]
Starting base/sysctl...                          [ OK ]
Received event poefw.done
starting base/portmapper...                      [ OK ]
Received event syslog.done
Starting base/reboot-stability...                [ OK ]
Starting base/cron...                            [ OK ]
Starting base/appmond...                         [ OK ]
Starting hardware/openhpi...                     [ OK ]
Starting hardware/timeout...                     [ OK ]
Starting base/inet...                            [ OK ]
Starting base/modules...                         [ OK ]
Received event modules.done
Received event board.inserted
Received event hardware.done
Starting network/startup...                      [ OK ]
Starting base/external-media...                  [ OK ]
Starting network/stackd...                       [ OK ]
Starting network/election.timeout...             [ OK ]
Starting network/internal-tftpd...               [ OK ]
Starting network/internal-boop...                [ OK ]
08:00:46 awplus-1.5 chassis[2105]: Card 1.6 (AT-SBx81CFC960) has joined the
chassis
```

Figure 194. Initialization Messages for the Stack

```
Received event network enabled

Initializing HA processes:
cbtrd, hostd, nms, atmfd, bgpd, epsr
exfx, hsl, imi, imiproxyd, irdpd, lacp, lldpd
loopprot, mstp, ospf6d, ospfd, pdmd, pim6d, pimd
ripd, ripngd, rmon, sflowd, udidd, vrrpd

Received event network.initialized
08:00:54 awplus-1.5 chassis[2105]: Waiting for all chassis cards to
initialize.
08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.4 hotswapped in AT-StackOP
08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.3 hotswapped in AT-StackOP
08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.2 hotswapped in AT-StackOP
08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.1 hotswapped in AT-StackOP
08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.4 hotswapped in AT-StackOP
08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.3 hotswapped in AT-StackOP
08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.2 hotswapped in AT-StackOP
08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.1 hotswapped in AT-StackOP
08:00:54 awplus-1.5 chassis[2105]: Card 1.1 (AT-SBx81XS6) has joined the
chassis
08:00:54 awplus-1.5 chassis[2105]: Card 1.3 (AT-SBx81GT24) has joined the
chassis
08:00:54 awplus-1.5 chassis[2105]: Card 1.2 (AT-SBx81GP24) has joined the
chassis
.
.
.
08:00:55 awplus-1.5 chassis[2105]: Card 2.12 (AT-SBx81GP24) has joined the
chassis
08:00:56 awplus-1.5 chassis[2105]: Card 1.5 (AT-SBx81CFC960) has become the
Active CFC
08:00:56 awplus-1.5 chassis[2105]: Stack Virtual MAC is 0000.cd37.0c22
Received event vcs.elected-master

Assigning Active Workload to HA processes:
authd, bgpd, epsrd, imi, hsl, irdpd, lacpd, lldpd
loopprot, mstpd, nms, ospf6d, ospfd, pdmd, pim6d
pimd, ripd, ripngd, rmond, sflowd, vrrpd, imi
vrrpd

Received event network activated

Loading default configuration

done!
Received event network.configured

awplus login:
```

Figure 195. Initialization Messages for the Stack (Continued)

Verifying the Stack

After resetting or powering on the devices and waiting four minutes for the switches to complete initializing the management software and form the stack, you should verify the stack. To verify the stack, perform the following procedure:

1. Start a local or remote management session on the stack. You may use the RS-232 Console port on any controller card in the stack to establish a local management session. You do not have to use the RS-232 Console port on the active master controller card.

   Note
   If you prefer to use the RS-232 Console port on the active master controller card for the management session, you can determine the active card by examining the CFC LEDs. The LEDs are green on the active master controller card and amber on the standby master controller cards.

2. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode:

```
awplus> enable
awplus#
```

3. In the Privileged Exec mode, enter the SHOW STACK command.

```
awplus# show stack
```

   Figure 196 is an example of the command for a stack that has four controller cards.

```
Virtual Chassis Stacking summary information

ID    Pending ID    MAC address      Priority     Status     Role
1.5   -             eccd.6d9e.331c   128          Ready      Active CFC
1.6   -             eccd.6d9e.3308   128          Ready      Backup Member
2.5   -             eccd.6d9e.3328   128          Ready      Backup Member
2.6   -             eccd.6d9e.3302   128          Ready      Backup Member
```

Figure 196. SHOW STACK Command

If the stack is operating properly the command lists the controller cards in both switches of the stack. For instance, the command lists four controller cards if there are two controller cards in each chassis. The command displays only two controllers if each switch has only one controller card.

4. Do one of the following:

   - If the SHOW STACK command is displaying all the controller cards in the stack, the stack is operating normally. If you have optional feature licenses to install, go to “Installing Optional Feature Licenses” on page 309. Otherwise, you may begin to configure the parameter settings of the ports and features of the stack with the commands in the command line interface. For instructions, refer to Software Reference for SwitchBlade x8100 Series Switches.
   - If the SHOW STACK command is displaying the controller cards from only one chassis, the switches were not successful in forming the stack. Go to “Troubleshooting the Stack” on page 310.

Installing Optional Feature Licenses

You may now install the optional premium and AMF master licenses. Please review the following information before installing a feature license:

- When ordering a feature license from Allied Telesis for the stack, you must order two licenses, one for each chassis. However, you use only one license to activate the feature. The active controller card automatically copies new feature license to all the controller cards in the stack, thereby activating the license on both switches.

  For example, to install the premium feature license on a stack, you have to order two premium licenses from Allied Telesis and then use one of the licenses to activate the feature on the stack.

- Feature licenses are installed with the LICENSE command in the Privileged Exec mode. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches.
- Feature licenses for the AT-SBx81CFC400 Controller Fabric Card are not compatible with the AT-SBx81CFC960 Card.

Troubleshooting the Stack

The best way to determine if the switches are operating as a stack is with the SHOW STACK command, as explained in “Verifying the Stack” on page 307. If the command indicates that the switches are not operating as a stack, you may be able to identify and resolve the problem with the suggestions in this section.

The first thing to check is the stacking trunk that links the switches together. Here are some things to check:

- Verify that the SFP+ slots on the controller cards contain only stacking transceivers. You may not use standard SFP+ transceivers to build the trunk.
- Verify that the stacking transceivers are firmly inserted into the SFP+ slots and that the fiber optic cables are properly secured to the transceivers.
- Inspect the L/A LEDS for the slots. They should be solid or flashing green.
- Verify that there are no network devices, such as media converters or other switches, between the stacking transceivers in the switches.
- Verify that you are using the correct type of fiber optic cable and are not exceeding the maximum operating distance of the transceivers. For more information, refer to “Stack Trunk and Stacking Transceivers” on page 271 and “Fiber Optic Specifications of the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers” on page 321.

Refer to “Fiber Optic or Twisted Pair Transceivers” on page 225 for additional troubleshooting suggestions for the stacking transceivers.

If the trunk is operating correctly, the switches may have a configuration problem that is preventing them from forming the stack. You may be able to identify the problem with the following suggestions. It is important to remember that at this point the switches, having been unsuccessful at forming the stack, are operating as stand-alone units, which means that you have to manage them with separate local management sessions.

- Use the SHOW SYSTEM command in the Privileged Exec mode of the command line interface to confirm that the switches have the same version of the AlliedWare Plus management software. If they have different versions, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions on how to upgrade the software.
- Use the SHOW LICENSE BRIEF command in the Privileged Exec mode to confirm that you installed the VCStack Plus licenses and

enabled the feature on the switches. If a switch does not have the license, perform “Activating the VCStack Plus Feature License” on page 287 to install it. If the command shows that the license is activated but the feature is not enabled, perform “Enabling the Stacking Feature” on page 289.

- Use the SHOW LICENSE BRIEF command to confirm that they have the same feature licenses. If they have different licenses, add or delete licenses so that they have the same feature licenses.
- Use the SHOW STACK command to compare the ID numbers of the switches. One switch should have the ID 1 and the other ID 2. To configure the ID numbers, perform “Setting the ID Number” on page 293.

You might also try watching for error messages on the Console port on one of the controller cards when you power on or reset the switches. Here are the messages:

- The following error message indicates that the two chassis have different feature licenses. Switches cannot form a stack if they have different licenses. Perform “Displaying the Feature Licenses” on page 291 on both switches to determine which switch needs a license. For example, if, after performing the procedure, you determine that one of the switches has the premium license and the other one does not, obtain and install the premium license on the other unit.

```
chassis[nnnn] Software feature licensing incompatible. Card
n.n will boot as a standalone system
```

- This error message indicates that the stack detects one or more standard SFP+ transceivers in the SFP+ slots of the controller cards. The SFP+ slots only support stacking transceivers when the stacking feature is enabled on the switch. Remove the standard transceivers and replace with stacking transceivers.

```
EXFX[nnn]: ERROR: stack port n.n.n - Only AT-StackOP support
in this port. Please remove
```

- This error message indicates that the two switches cannot form the stack because they have different versions of the AlliedWare Plus management software. To resolve the problem, update the software on one of both systems so that they have the same version.

```
chassis[nnn]: Neighbor on link portn.n.n cannot join stack -
incompatible stack S/W versions.
```

Appendix A
Technical Specifications

Physical Specifications

Dimensions (W x D x H)

Table 26. Product Dimensions

AT-SBx8106 Chassis	48.03 cm x 38.79 cm x 17.63 cm 18.91 in x 15.27 in x 6.94 in)
AT-SBxPWRSYS1 AC System Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRPOE1 PoE Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRSYS1 DC System Power Supply	10.16 cm x 34.2 cm x 4.34 cm (4.00 in x 13.46 in x 1.71 in)
AT-SBxFAN06 Tray Module	2.62 cm x 29.81 cm x 10.30 cm (1.03 in x 11.73 in x 4.05 in)
All Cards AT-SBx81GT24 Line Card AT-SBx81GT40 Line Card AT-SBx81GP24 PoE Line Card AT-SBx81GS24a SFP Line Card AT-SBx81XS6 SFP+ Line Card AT-SBx81XS16 SFP+ Line Card AT-SBx81CFC960 Controller Fabric Card	20.67 x 31.32 cm x 4.06 cm (8.14 in x 12.33 in x 1.6 in)

Weight (Kilograms)

Table 27. Product Weights

AT-SBx8106 Chassis	14.42 kg (31.80 lb) with three PSU and six line card blank panels
AT-SBx81GT24 Line Card	0.93 kg (2.05 lb)
AT-SBx81GT40 Line Card	1.04 kg (2.30 lb)

Table 27. Product Weights (Continued)

AT-SBx81GP24 PoE Line Card	1.06 kg (2.34 lb)
AT-SBx81GS24a SFP Line Card	1.06 kg (2.34 lb)
AT-SBx81XS6 SFP+ Line Card	1.06 kg (2.34 lb)
AT-SBx81XS16 SFP+ Line Card	1.4 kg (3.09 lb)
AT-SBx81CFC960 Controller Fabric Card	1.13 kg (2.50 lb)
AT-SBxPWRSYS1 AC System Power Supply	2.75 kg (6.05 lb) with power cord
AT-SBxPWRPOE1 PoE Power Supply	2.73 kg (6.00 lb) with power cord
AT-SBxPWRSYS1 DC System Power Supply	1.9 kg (4.2 lb)
AT-SBxFAN06 Tray Module	1.82 kg (4.00 lb)

Environmental Specifications

Table 28. Environmental Specifications

Operating Temperature	-0° C to 40° C (32° F to 104° F)
Storage Temperature	-25° C to 70° C (-13° F to 158° F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Operating Altitude Range	Up to 3,000 m (9,843 ft)
Acoustic Noise	76.7 dB

Note
The acoustic noise was measured at 40° C with the following products installed:

Table 29. Acoustic Noise Test Components

Product	Quantity
AT-SBx8106 Chassis	1
AT-SBx81CFC960 Controller Fabric Card	2
AT-SBx81GP24 PoE Line Card	4
AT-SBxPWRSYS1 AC System Power Supply	2
AT-SBxPWRPOE1 PoE Power Supply	2
AT-SBxFAN06 Module	1

Power Specifications

AC Voltage, Frequency Requirements (Volts, Hertz)

Table 30. AC Voltage and Frequency Requirements

AT-SBxPWRSYS1 AC Power Supply	100 - 120 / 200 - 240 VAC, 16/8A, 50/60 Hz, (per input)
AT-SBxPWRPOE1 AC Power Supply	100 - 120 / 200 - 240 VAC, 16/8A, 50/60 Hz, (per input)

CC Voltage Requirements

Table 31. DC Voltage Requirements

AT-SBxPWRSYS1 DC Power Supply	40 - 60V dc (-0% - +20%), 36A (maximum per input)

Typical power savings in eco-friendly mode (Watts)

Table 32. Typical Power Savings in eco-friendly Mode

AT-SBx81GT24	0.12 W
AT-SBx81GT40	0.79 W
AT-SBx81GP24	0.24 W
AT-SBx81GS24a	0.20 W
AT-SBx81XS6	0.10 W
AT-SBx81XS16	0.66 W

Maximum power consumption (Watts)

Table 33. Maximum Power Consumption

AT-SBx81GT24	34.4 W
AT-SBx81GT40	53.9 W
AT-SBx81GP24	34.4 W
AT-SBx81GS24a	56.3 W
AT-SBx81XS6	54.8 W

Table 33. Maximum Power Consumption (Continued)

AT-SBx81XS16	78.4 W
AT-SBx81CFC960	75.0 W

Maximum power supply efficiency (based on 100V input voltage)

Table 34. Maximum Power Efficiency

AT-SBxPWRSYS1 AC	Up to 90%
AT-SBxPWRPOE1 AC	Up to 90%
AT-SBxPWRSYS1 DC	Up to 90%

Heat dissipation (British Thermal Units/hour)

Table 35. Heat Dissipation

AT-SBx81GT24	146.72 BTU/hr
AT-SBx81GT40	183.74 BTU/hr
AT-SBx81GP24	146.72 BTU/hr
AT-SBx81GS24a	240.13 BTU/hr
AT-SBx81XS6	233.73 BTU/hr
AT-SBx81XS16	267.6 BTU/hr
AT-SBx81CFC960	225.91 BTU/hr
AT-SBxPWRSYS1 AC	5118.21 BTU/hr
AT-SBxPWRPOE1 AC	5118.21 BTU/hr
AT-SBxPWRSYS1 DC	5118.21 BTU/hr

Available Power over Ethernet (Watts/port):

Table 36. Available Power Over Ethernet with One PoE Power Supply

One PoE Power Supply Installed	1200 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	40 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	77 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	96 ports Maximum

Table 36. Available Power Over Ethernet with One PoE Power Supply

IEEE 802.3af Class 1 (4.0 W /port)	96 ports Maximum

Table 37. Available Power Over Ethernet with Two PoE Power Supplies

Two PoE Power Supply Installed	2400 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	80 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	96 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	96 ports Maximum
IEEE 802.3af Class 1 (4.0 W /port)	96 ports Maximum

PoE Mode

Table 38. PoE Mode on the AT-SBx81GP24 PoE Line Card

IEEE 802.3af / IEEE 802.3at:	Alternative Mode A

Safety and Electromagnetic Emissions Certifications

Safety and Electromagnetic Emissions:

Table 39. Safety and Electromagnetic Emissions

EMI/RFI	FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A
Immunity	EN55024
Electrical Safety	EN60950-1 (TUV), UL60950-1 ($_{c}$UL$_{us}$), EN60825
Safety Agency Approvals	$_{c}$UL$_{us}$, TUV, C-TICK, CE

Port Pinouts

This section has the pinouts for the ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards, and the NET MGMT port on the AT-SBx81CFC960 Controller Fabric Card.

Figure 197 illustrates the pin layouts for RJ-45 and RJ point 5 ports.

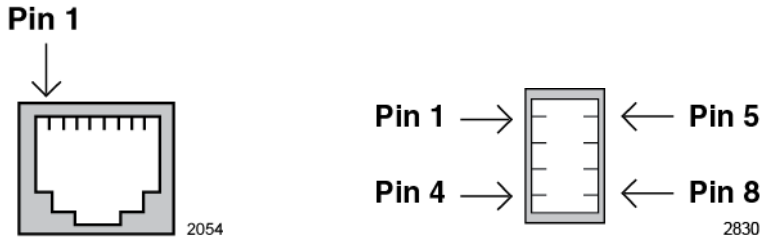


Figure 197. Pin Numbers for RJ-45 and RJ Point 5 Ports (Front View)

Table 40 lists the pin signals when a twisted-pair port is operating in the MDI configuration.

Table 40. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 41 lists the port pin signals for the MDI-X configuration.

Table 41. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 42 lists the port pin signals when a 10/100/1000Base-T port is operating at 1000 Mbps.

Table 42. 1000Base-T Connector Pinouts

Pin	Pair	Signal
1	1	TX and RX+
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-

Fiber Optic Specifications of the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers

Table 43 lists the fiber optic port specifications for the AT-StackOP/0.3 transceiver.

Table 43. Fiber Optic Port Specifications for the AT-StackOP/0.3 Module

General	
Maximum Distances	33 m with 62.5/125 µm (core/cladding) multimode fiber optic cable 300 m with 50/125 µm (core/cladding) multimode fiber optic cable
Fiber Optic Cable	50/125 µm or 62.5/125 µm (core/cladding) multimode fiber optic cable
Transmitter	
Wavelength	850 nm
Output Optical Power	-7.3 dBm min.
Receiver	
Wavelength	850 nm
Maximum Sensitivity	-9.9 dBm
Maximum Input Power	-1 dBm

Table 44 lists the fiber optic port specifications for the AT-StackOP/9.0 transceiver.

Table 44. Fiber Optic Port Specifications for the AT-StackOP/9.0 Transceiver

General	
Maximum Distances	9 km
Fiber Optic Cable	9/125 µm (core/cladding) single-mode fiber optic cable

Table 44. Fiber Optic Port Specifications for the AT-StackOP/9.0 Transceiver (Continued)

Transmitter	
Wavelength	1310 nm
Output Optical Power	-8.2 dBm min. +0.5 dBm max.
Receiver	
Wavelength	1310 nm
Maximum Sensitivity	-14.4 dBm
Maximum Input Power	0.5 dBm